

January 2015 Intellectual Property Roundtable

The 3D Revolution: IP Issues Arising from the Proliferation of 3D Printing



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I. **THE 3D REVOLUTION**

Gartner, Inc. touts itself as “the world’s leading information technology research and advisory company.” Accordingly, intellectual property lawyers should heed Gartner’s prophecy that the “escalation of 3D printing capabilities will change retail models and threaten intellectual property.” Gartner’s predictions include:

- 3D printing will result in the loss of more than \$100 billion per year in global IP revenue by 2018.
- At least seven of the world's top 10 multichannel retailers will be using 3D printing technology to generate custom stock orders by 2018.
- The rapid advancement of 3D printing for the production of living tissue and organs (“bioprinting”) will foster major ethical debates.
- There will be an explosion in demand for 3D technology to meet medical needs in underserved emerging markets (i.e. 3D printed prosthetic limbs.)

Regardless of the reliability of such predictions, 3D printing technology will give rise to multiple intellectual property issues in the coming years.

A. What is 3D printing and why is it a big deal?

Traditional methods of manufacturing require expensive machinery and molds or casts. The high cost associated with such equipment acts as a barrier to entrance into the market. It also restricts variation and customization. 3D printing (known as “additive manufacturing”) creates or “prints” a desired object “layer by layer” using a variety of raw materials including plastics, metals, clays and even chocolate (Hershey and 3D Systems recently unveiled their new Chocolate 3D printer capable of creating elaborate shapes in dark, milk, or white chocolate.)

3D printers utilize a blueprint in the form of a Computer Aided Design (“CAD”) file. The CAD file can be created manually or via sophisticated 3D scanners capable of “scanning” three dimensional objects.

3D printing has already been widely utilized in major industries such as automotive (auto design and parts); aerospace (NASA sends 3D printers into space for emergency replacement parts and tools); healthcare (custom implants and orthotics); and military (3D printers provide on demand replacement parts in the field). Small business and consumer use is expected to increase dramatically as 3D printers become more affordable. (A steep increase in 2015 has been predicted due to the recent expiration of several key patents.) For those who think 3D printers are too big, clumsy and cost prohibitive for widespread consumer use – recall the early stages of the computer revolution. (“I think there is a world market for maybe five computers.” Thomas Watson, President of IBM, 1943).

Because 3D printers copy and create replicas of existing 3D objects, they raise a host of intellectual property concerns. Many fear the erosion of non-legal deterrents to infringement (i.e. high capital costs) will result in widespread infringement rendering traditional legal enforcement useless and devaluing intellectual property.

The music industry is frequently cited for comparison. Leading commentators argue 3D printing will effect change in the manufacturing industry in much the same way digitization altered the music industry:

3D printing will unleash the power of digitized things on manufacturers. The PC and the Internet put digitization into consumers' hands, slashed copying and distribution costs, and weakened entry barriers to economic sectors that provided certain nonrivalrous goods. Nonrivalrous goods are like an idea; once created, their capacity is infinite as “there is no additional marginal cost in allowing others to use [them].” . . . Once digitization hit the copyright industry, it felt the full force of nonrivalry. . . [A]nyone could make and distribute copyrighted goods. To date, companies relying on patent to protect nonrivalrous goods have not had to face potential broad-based copying. 3D printing will challenge those companies. Lower costs, the ability to make specialized and just-in-time parts, and a return to local manufacturing are all positive developments that should be embraced. Yet these advances will threaten, if not destroy, many firms and jobs that live off rents from intellectual property.

Devan Desai and Garard Magliocca, *Patents Meet Napster: 3D Printing and Digitization of Things*, 102 Geo. L.J. 1691 (2014). As with digital music, the coming years will see a host of intellectual property cases, issues and legislative activity involving 3D Printing.

B. Forms of Intellectual Property Protection

1. Copyright

a. “Pictorial, Graphic and Sculptural Works”

U.S. copyright law protects original “pictorial, graphic, and sculptural works.” 17 U.S.C. §102(a)(5). This includes three-dimensional works of art. Examples of such works include artificial flowers and plants, dolls, toys, jewelry designs, models, sculptures and figurines. Traditional copyright laws will afford protection to copyright protected work duplicated by a 3D printer. Several variations merit discussion.

b. **“Useful Articles”**

Copyright protection is generally not available to articles which have a utilitarian function. Copyright protection for such “useful articles” extends only to “features that can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article.” “Useful articles” are defined as those goods “having an intrinsic utilitarian function that is not merely to portray the appearance of the article or to convey information.” 17 U.S.C. §101.

Determining the scope of copyright protection for useful articles is fact intensive and indefinite at best. However, the exclusion of “useful articles” leaves open the ability of 3D printers to supply objects used in our everyday lives without necessarily implicating copyright law.

c. **Computer Software**

Computer programs are protected as “literary works” under the Copyright Act. 17 U.S.C. §102(a)(1). Both source code and object code are considered “literary works” because they are original works of authorship “expressed in words, numbers, or other verbal or numerical symbols or indicia.” 17 U.S.C. §101.

The underlying CAD files which facilitate 3D printing constitute computer software eligible for copyright protection. Accordingly, U.S. copyright law will prohibit the unauthorized distribution of copyright protected CAD files for use with 3D printers.

(1) **Originality Requirement for CAD Files**

In order to be eligible for copyright protection, the subject CAD file must meet the requisite “originality” requirement. The U.S. Supreme Court set a low bar for meeting the originality requirement in *Feist Publications, Inc. v. Rural Telephone Service*, 499 U.S. 340 (1991). In order to qualify, a work must: 1) be independently created by the author (as opposed to copied from other works); and 2) possess at least some minimal degree of creativity.

Leading commentators argue scans of 3D objects in the public domain will not pass the originality test:

There is a solid argument that no originality is involved in [scanned] design[s] at all. A 3D scan that is not modified cannot be compared to a photograph, which is an original (and copyrightable) work that combines reality with the expression of the photographer. A person who uses a scanner to get an exact copy of an object, by contrast, contributes nothing to the result.

Devan Desai and Garard Magliocca, *Patents Meet Napster: 3D Printing and Digitization of Things*, 102 Geo. L.J. 1691 (2014).

In support of their contention, Desai and Magliocca cite to *Meshwerks, Inc. v. Toyota Motor Sales U.S.A., Inc.*, 528 F.3d 1258 (10th Cir. 2008). In *Meshwerks*, the 10th Circuit held that a 3D scan using older technology was not sufficiently original to be entitled to copyright protection. *Id.* The Court explained Meshwerks process as follows:

Meshwerks took copious measurements of Toyota's vehicles by covering each car, truck, and van with a grid of tape and running an articulated arm tethered to a computer over the vehicle to measure all points of intersection in the grid. Based on these measurements, modeling software then generated a digital image resembling a wire-frame model. In other words, the vehicles' data points (measurements) were mapped onto a computerized grid and the modeling software connected the dots to create a "wire frame" of each vehicle.

Id. Despite Meshwerks' painstaking efforts, the Court determined the resulting files were not original and therefore not amenable to copyright protection. According to the court the files were "not so much independent creations as (very good) copies of Toyota's vehicles" and "depict[ed] nothing more than unadorned Toyota vehicles--the car as car." Based on this reasoning, a scanned 3D CAD file would presumably likewise not merit copyright protection.

d. **Merger Doctrine**

The copyright merger doctrine provides that if an idea and the expression of such idea are so tied together such that there is a very limited number of ways to express or embody the idea in a work, the expression of the idea is uncopyrightable. This is akin to the "scenes a faire" doctrine which provides that certain well established story lines, fables, folklore, scenes of nature, and other common visual and cultural references are not copyrightable. Such "scenes a faire" are part of the public domain.

Desai and Magliocca theorize that 3D printing will foster a new debate and potential expansion of the merger doctrine. They reason:

A CAD file may give the merger doctrine more relevance than it has had to date. Consider software that is written to make a statue that looks like one of the giant heads (or moais) from Easter Island. The idea and the expression there could be described as identical--a statue that looks like a giant Easter Island head. The software can only do one thing. Most other software, by contrast, can do multiple things or be described as an expression of some idea (for example, a spreadsheet). The moai program does not present a merger problem if the CAD file is classified at a higher level of generality (making art from indigenous cultures), but it is not clear why the software should be viewed in that way. The design file could also be seen as the specific iteration of a specific trail.

Devan Desai and Garard Magliocca, *Patents Meet Napster: 3D Printing and Digitization of Things*, 102 Geo. L.J. 1691 (2014).

e. **Derivative Works**

A derivative work is a work based on or derived from one or more already existing works. 17 U.S.C. § 101. The right to create derivative works is one of the exclusive rights of a copyright holder. 17 U.S.C. § 106(2). At least one commentator has suggested CAD files created using copyrighted protected 3D objects constitute derivative works. Daniel Harris Brean, *Asserting Patents to Combat Infringement Via 3D Printing: It's no "Use"* 23 Fordham Intell. Prop. Media & Ent. L.J. 771 ("A CAD file distributor could thus be . . .infringing the copyright in the article itself by having made, copied, and distributed a derivative work of the article.")

f. **DMCA Take-Down Notices**

The Digital Millennium Copyright Act ("DMCA") notice and takedown provisions provide a vehicle for copyright owners to force online service providers to discontinue infringing activity by third parties. Upon proper notification by the copyright holder, online service providers can insulate themselves from liability by removing infringing files. The DMCA's "safe harbor" provisions may provide an effective tool for copyright owners to combat the online sale or distribution of infringing CAD files and/or 3D printed articles.

2. **Patents**

a. **Direct Infringement**

Direct infringement is the unauthorized making, using, selling, offering for sale, or importing of the patented invention. 35 U.S.C. §271. Accordingly, the printing ("making"), sale, or use of patented products will constitute direct infringement.

While traditional direct infringement claims will be effective against large commercial 3D printers and sellers of patented products, this is not the anticipated business model. Rather, the head of the distribution chain will generally sell or distribute CAD files for end use by small businesses and consumers. This poses obstacles to relying on direct infringement theories.

(1) **Do CAD Files Constitute the "Patented Invention" Under § 271(a)?**

Are sellers of CAD files offering for sale and selling the patented invention under §271(a)? If so, they would be directly liable for patent infringement. At least one commentator makes a compelling argument CAD files are not the equivalent of the underlying infringing product:

The requirement under § 271(a) that the sale be of “any patented invention” implicates the particular claims of the patent, since “[i]t is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” If a patent claims a physical product, that physical product is what must be sold or offered for sale in order to satisfy § 271(a).

Daniel Harris Brean, *Asserting Patents to Combat Infringement Via 3D Printing: It’s no “Use”*
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If the sale of CAD files does not constitute direct infringement, patent holders are left with a high volume of small value direct infringement claims against end user consumers. The music industry taught us that pursuing such claims is not practical or feasible. Accordingly, patent holders will likely be forced to rely heavily on theories of indirect infringement to attack the head of the distribution chain.

b. Indirect Infringement

(1) Active Inducement

Section 271(b) makes it unlawful to "actively induce infringement of a patent." Active inducement occurs when one encourages another to engage in infringing activity with “knowledge that the induced acts constitute patent infringement.” *Global-Tech Appliances, Inc. v. SEB S.A.*, 131 S. Ct. 2060 (2011). The requisite knowledge standard is one of “willful blindness” requiring: 1) subjective belief that there is a high probability infringement exists; and 2) deliberate actions to avoid confirming such infringement. *Id.* Despite the heightened knowledge standard, active inducement claims are a viable tool for pursuing flagrant sellers of CAD files having as their sole purpose the production of infringing products.

(2) Contributory Infringement

Contributory infringement is defined as the sale, or offer to sell, within the United States or the importation into the United States of "a component of a patented machine, manufacture, combination, or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use." 35 U.S.C. §271(c).

In order to establish contributory infringement, a patent owner must show: 1) that there is direct infringement; 2) that the accused infringer knew that the combination for which its components were being made was both patented and infringing; 3) that the component has no

substantial noninfringing uses; and 4) that the component is a material part of the invention. *Fujitsu Ltd. v. Netgear Inc.*, 620 F.3d 1321 (Fed. Cir. 2010)

Commentators question whether a CAD file will be found to constitute a “component” for purposes of contributory infringement. Their concern derives from the narrow interpretation of “component” adopted in *Microsoft Corp. v. AT&T Corp.*, 550 U.S. 437 (2007). In *Microsoft*, the Court construed the meaning of “component” in the context of § 271(f). Section 271(f) makes it an infringement to export unassembled components of a patented invention to induce assembly of the invention outside the United States in a manner that would infringe the patent if such combination occurred within the United States.

AT&T holds a patent on an apparatus for digitally encoding and compressing recorded speech. Microsoft’s Windows software, when installed, rendered the subject computer infringing. Microsoft sent a master version of its Windows software abroad, either on disk or via electronic transmission. Copies of the master were made abroad and installed on computers. Microsoft denied liability for such foreign activities on the grounds the master version of its software did not constitute a “component” within the meaning of § 271(f).

The Court adopted a narrow interpretation of “component” in the software context. According to the Court, software constitutes mere information and detailed instructions akin to “a blueprint. . . schematic, template, or prototype.” Accordingly, software cannot constitute a “component” until such time as it is expressed on a computer readable medium. Commentators opine that CAD files for use with 3D printers are likely to be viewed in the same restrictive fashion under Section 271(c). Daniel Harris Brean, *Asserting Patents to Combat Infringement Via 3D Printing: It’s no “Use”* 23 Fordham Intell. Prop. Media & Ent. L.J. 771.

C. Licensing Models - “If You Can’t Beat ‘Em Join ‘Em”

The inherent difficulties of relying on traditional legal theories when combating infringement in the digital age has caused certain manufacturers to borrow from the iTunes playbook. Observers believe a licensing model can succeed in the 3D printing arena despite the availability of free alternatives:

Although the entertainment industry makes a credible complaint that “it is impossible to compete with free,” there have actually been several documented cases of artists who have successfully competed with those who offered their work for free in violation of copyright law. Of course, individual examples are insufficient to declare a trend. Yet there are studies showing that the availability of content for purchase can decrease file sharing, and the unavailability of legal content for purchase can result in increased peer-to-peer sharing, in violation of copyright law. If given the opportunity, rational consumers will purchase digital content that is appropriately priced, free of viruses, and of high quality. With physical products, consumers will consider printable designs that they know will work and are virus free, if those designs are priced appropriately.

Devan Desai and Garard Magliocca, *Patents Meet Napster: 3D Printing and Digitization of Things*, 102 Geo. L.J. 1691 (2014).

Consistent with this theory, Hasbro has partnered with 3D printing pioneer Shapeways to make its popular “My Little Pony” brand available to fans online via 3D printing. Nike utilizes 3D printing technology to produce high performance sport cleats. Such cleats will inevitably soon be available for home production -- swoosh and all -- via licensed CAD files.

Are predictions of the demise of IP due to 3D printing greatly exaggerated? (*See* VCR and Napster). Or, will 3D printing be the next “internet” and spawn a new industrial revolution with evolving forms of intellectual property? Time will tell.