3D Printing: Implications for Patents, Trademarks, Trade Secrets and Copyrights
Challenges With Additive Manufacturing, Policing and Enforcement Strategies to Protect IP

TUESDAY, SEPTEMBER 18, 2018
1pm Eastern | 12pm Central | 11am Mountain | 10am Pacific

Today’s faculty features:

Elizabeth D. Ferrill, Partner, Finnegan Henderson Farabow Garrett & Dunner, Washington, D.C.
Christopher Higgins, Attorney, Orrick Herrington & Sutcliffe, Washington, D.C.
Marc H. Trachtenberg, Shareholder, Greenberg Traurig, Chicago

The audio portion of the conference may be accessed via the telephone or by using your computer’s speakers. Please refer to the instructions emailed to registrants for additional information. If you have any questions, please contact Customer Service at 1-800-926-7926 ext. 1.
Tips for Optimal Quality

**Sound Quality**
If you are listening via your computer speakers, please note that the quality of your sound will vary depending on the speed and quality of your internet connection.

If the sound quality is not satisfactory, you may listen via the phone: dial **1-866-755-4350** and enter your PIN when prompted. Otherwise, please send us a chat or e-mail **sound@straffordpub.com** immediately so we can address the problem.

If you dialed in and have any difficulties during the call, press *0 for assistance.

**Viewing Quality**
To maximize your screen, press the F11 key on your keyboard. To exit full screen, press the F11 key again.
Continuing Education Credits

In order for us to process your continuing education credit, you must confirm your participation in this webinar by completing and submitting the Attendance Affirmation/Evaluation after the webinar.

A link to the Attendance Affirmation/Evaluation will be in the thank you email that you will receive immediately following the program.

For additional information about continuing education, call us at 1-800-926-7926 ext. 2.
Program Materials

If you have not printed the conference materials for this program, please complete the following steps:

• Click on the ^ symbol next to “Conference Materials” in the middle of the left-hand column on your screen.
• Click on the tab labeled “Handouts” that appears, and there you will see a PDF of the slides for today’s program.
• Double click on the PDF and a separate page will open.
• Print the slides by clicking on the printer icon.
Marc Trachtenberg is a Shareholder at Greenberg Traurig, LLP’s Chicago office in the IP and Technology Group.

Mr. Trachtenberg focuses his practice on domain name, internet, eCommerce, advertising, promotions, trademark, copyright, and innovative technologies. He represents clients in matters involving promotion and protection of their IP, both online and in the brick-and-mortar world. In this capacity, Mr. Trachtenberg helps clients implement strategies to protect their IP rights, identifies threats to online brand presence, and enforces these rights. He is also very active in the area of 3D printing and other innovative technologies and advises clients regarding potential implications of such technologies on IP rights and business processes and regularly speaks on the topic.
Christopher Higgins is the co-leader of the firm’s 3D Printing Group and is an experienced patent litigator.

He represents clients in federal court actions, ITC investigations, and in proceedings before the USPTO. Mr. Higgins has developed a global reputation as an authoritative source on legal issues in 3D printing and has been a featured speaker at 3D printing events around the world. His 3D printing practice includes advising startups and established 3D printing companies on all aspects of intellectual property law, cybersecurity, and technology transactions.
Elizabeth Ferrill is a Partner in the Washington D.C. Office of Finnegan LLP.

Ms. Ferrill focuses her practice on all aspects of design patents, including prosecution, counseling, and litigation. She also has extensive experience in utility patent litigation in the areas of software- and hardware-related technologies. She counsels clients who hold design patents as well as those accused of infringement. She has experience with consumer and industrial products, graphical user interfaces and icons. She has prosecuted families of design patents before the USPTO, directed prosecution in foreign countries, and argued appeals before the PTAB.
3D Printing: Implications for Patents, Trademarks, Trade Secrets and Copyrights

SEPTEMBER 18, 2018
Agenda

- What is 3D printing?
- Why do companies use 3D printing?
- Utility & design patents
- Trade secret protection
- Policing and Enforcement Strategies
- Protecting the Digital Design File
- Recent cases
What is 3D Printing?
What is 3D Printing?

- Manufacturing process where objects are created by depositing layers of material on top of each other based on a 3 dimensional digital map
- Known as “Additive Manufacturing” in industry
  - Traditional manufacturing is “subtractive manufacturing”
    - Objects created by removing material
    - E.g., cutting out a pattern from sheet metal or plastic
    - Machining, tooling, etc.
What is 3D Printing?

- Not new
  - First invented in the 1980s
  - Originally only metal and plastics
  - Objects printed using only one material
  - Generally 1 color - usually the color of the material
What is 3D Printing?

- Technology and capabilities have increased significantly since then
  - More complex objects can be created using traditional materials
    - Metals, plastics, and ceramics
  - Movement toward use of non-traditional materials
    - E.g., Sugar and chocolate, Food, cells/living tissue, textiles
  - Creation of new materials specifically for 3D printing
    - E.g., nanomaterials for creating super-alloys
  - New materials created by 3D printing
    - E.g., Graphene
      - The lightest material in the world - has mechanical strength exceeding steel, electric and thermal conductivity, and unusual magnetic properties
What is 3D Printing?

- Printers being developed that can
  - change the properties of the materials to create different textures
  - use more than one material

- No longer one color
  - Full color inkjet printing
  - Approaching photo quality
How Does 3D Printing Work?

- 3D Printing / Additive Manufacturing is an umbrella term for an increasing number of different technologies
- All processes share the same first steps
  - The 3D printer reads an STL or other 3D data file
  - Printer’s operating software cuts a 3D digital model of the object into slices
- After that varies, but generally
  - Layer of material deposited on the build platform
  - Some form of energy or adhesive used to fuse, bond, or cure (harden) material
    - Laser, plasma, glue, pressure
  - Process repeated layer by layer until object complete
Why Do Companies Use 3D Printing?

1. Shortening of the product development lifecycle
2. Ability to create objects that cannot be created using traditional machining and tooling processes
3. Increased supply chain efficiency
4. It's Greener
Where is 3D printing Being Used?

Simple answer: EVERYWHERE

Used across almost every industry

- architecture, construction, industrial design, automotive, aerospace, military, engineering, dental and medical industries, biotech (human tissue replacement), fashion, footwear, jewelry, eyewear, education, geographic information systems, food, etc.

Almost unlimited applications

- New ones being created every day
Where is 3D printing Being Used?
Where is 3D printing Being Used?
Where is 3D printing Being Used?

- Consumers also engaging in 3D printing in rapidly increasing numbers
  - Brick and mortar maker spaces
Where is 3D printing Being Used?

- Consumers also engaging in 3D printing in rapidly increasing numbers
- Brick and mortar maker spaces
- At home printing
Where is 3D printing Being Used?

- Consumers also engaging in 3D printing in rapidly increasing numbers
- Brick and mortar maker spaces
- At home printing
- Online maker spaces
Where is 3D printing Being Used?

CREATE YOUR PRODUCT. BUILD YOUR BUSINESS.

Design
Design your product with us.
START A PROJECT

Make
Industrial 3D printing, scaled for you.
MAKE A PRODUCT

Sell
Do more business, more easily.
LEARN MORE
Utility Patents & 3D Printing
Patent Landscape for 3D Printing

- Additive Manufacturing related patents since 1995 (orange)
- AM-related published patent applications since 2001 (gray)

2017
- 26% increase in issued patents
- 28% increase in published apps

Source: U.S. Patent and Trademark Office
## Patent Landscape for 3D Printing By Sector

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AM hardware/methods</td>
<td>19</td>
<td>6</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>AM materials</td>
<td>9</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>AM software</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Academic institutions</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Aerospace</td>
<td>15</td>
<td>12</td>
<td>11</td>
<td>15</td>
<td>16</td>
<td>15</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Architectural</td>
<td>4</td>
<td>9</td>
<td>10</td>
<td>13</td>
<td>10</td>
<td>7</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>Consumer products/electronics</td>
<td>5</td>
<td>17</td>
<td>14</td>
<td>9</td>
<td>11</td>
<td>9</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>Government/military</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Industrial/business machines</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>10</td>
<td>9</td>
<td>15</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>Medical/dental</td>
<td>14</td>
<td>16</td>
<td>22</td>
<td>23</td>
<td>23</td>
<td>19</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>Motor vehicles</td>
<td>2</td>
<td>12</td>
<td>11</td>
<td>11</td>
<td>13</td>
<td>12</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>8</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: U.S. Patent and Trademark Office
### Patent Landscape for 3D Printing By Sector

*Source: U.S. Patent and Trademark Office*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AM Hardware/Methods</td>
<td>7</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>AM Materials</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>AM Software</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>9</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Academic Institutions</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Aerospace</td>
<td>13</td>
<td>4</td>
<td>17</td>
<td>16</td>
<td>12</td>
<td>10</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Architectural</td>
<td>8</td>
<td>14</td>
<td>12</td>
<td>9</td>
<td>11</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Consumer Products/Electronics</td>
<td>15</td>
<td>22</td>
<td>14</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Government/Military</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Industrial/Business Machines</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Medical/Dental</td>
<td>16</td>
<td>21</td>
<td>17</td>
<td>21</td>
<td>23</td>
<td>28</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>Motor Vehicles</td>
<td>8</td>
<td>6</td>
<td>13</td>
<td>12</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>10</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

*Source: U.S. Patent and Trademark Office*
## Patent Landscape for 3D Printing By Assignee Type

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>86</td>
<td>83</td>
<td>85</td>
<td>83</td>
<td>85</td>
<td>82</td>
<td>80</td>
<td>84</td>
</tr>
<tr>
<td>Individual</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>9</td>
<td>6</td>
<td>12</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Lab/non-profit organization</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>University</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>4</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: U.S. Patent and Trademark Office
What Aspects of 3D Printing Are Worth Patenting?

- Printer Software
  - PC software
  - Mobile apps

- Processors
  - GPU design

- 3D Printer Hardware
  - Laser
  - Inkjet head
  - Reservoirs
  - Build platform
  - Elevator
  - Roller
  - Milling head

- 3D Printer Build Materials
  - ABS plastic
  - PLA
  - Polyamide
  - Glass
  - Epoxy resins, Silver
  - Titanium
  - Steel
  - Thermoplastics
  - Photopolymers
  - Carbon Fiber

- End Products
  - Endless possibilities

- Post-Processing
  - Smoothing
  - Coating
  - Conductivity
  - Eliminate need for post-processing
Section 101 Challenges

The *Alice* Test

**Question 1:**
Is the patent directed to a patent-ineligible concept (e.g., abstract idea)?

*Note:* With software patents, the answer is usually “Yes.”

**Question 2:**
Do the claimed elements, individually and/or as combined, transform the claimed invention into something patent-eligible?

**CONCLUSION:**
Claims ARE patent-eligible under § 101.

**CONCLUSION:**
Claims are NOT patent-eligible under § 101.

Source: https://www.orrick.com/Generic-Articles/The-Effect-of-the-Alice-Decision-on-Software-and-3D-Printing-Patents
Section 101 Challenges

Claiming steps of a 3D printer software program executed by a computer may not be patentable.

Automation of a “human element” via 3D printer software on a computer may not be patentable.

Rearranging data elements via a 3D printer software program may not be patentable.
Design Patents & 3D Printing
Design Patent Protection

- Patent protection for new, original, ornamental design for an article of manufacture
- No need to show copying to enforce
- 15 years of protection from issuance of patent

Virtual Design

Physical Design
Design Patent Protection

- Typical use cases
  - Counterfeits
  - Replacement parts
  - Protecting design aesthetic

- 3D printing use cases
  - Inventive part designs
  - Additional argument against impermissible “reconstruction” arguments
  - Virtual designs may assist in enforcement against on-demand service bureaus
When you make an unrestricted purchase of a patented system or patented component

- You **may repair** a patented system or patented component
- You **may not reconstruct** the patented system or patented component

Manufacturer may restrict sales of system or component to avoid exhaustion
How do you define your “system”? How many layers do you patent?
Repair v. Reconstruction

How do you define your “system”? How many layers do you patent?
Repair v. Reconstruction

How do you define your “system”? How many layers do you patent?

D999,998

D999,999
How do you define your “system”? How many layers do you patent?
Trade Secret Protection
What Can Trade Secrets Protect?

**Technical**
- Processes, chemical formulas, ingredients
- Machinery design, specifications, 3D models and print files
- Operation and Maintenance manuals
- R&D reports, plans, and objectives

**Financial**
- Costs of goods, supplier identities, ordering patterns
- Pricing models and discounts
- Distributor and dealer discounts

**Marketing & Sales**
- Customer lists
- Licensing information
- Market research and forecasts, plans, budgets
- Product delivery schedules
Trade Secret v. Patents

- Enforcement in federal courts
- Patent eligible
- Ability to reverse engineer
- Length of protection
- Company structure
- Budget considerations
- Need for patents
- Co-existence is possible
  - Maintain as a trade secret one or more of the steps for treating a metal for a finished product
  - Patent the finished product
Policing and Enforcement Strategies
Do IP owners need to worry?

The same attributes that make 3D printing desirable to industry also facilitate infringement and make the technology attractive to infringers:

- Ability to make an accurate copy based on a scan or file
- Low cost of entry (and getting lower)
- Don’t need a large space
  - Anywhere can be a factory – even a single room or vehicle
- Printers are mobile
  - Can be set up anywhere and immediately produce infringing products (and then be moved to another location), complicating enforcement
  - Customs can’t help keep out infringing products when they are made locally and don’t cross the border
Risks to IP Owners

Do IP owners need to worry?

- Gartner estimates that by 2018, 3D printing will result in the loss of at least $100 billion per year in intellectual property globally.
Protecting IP in A 3D Printing World

What rights might be violated?

- **Patent**
  - E.g., printing a patented fastener or other device

- **Trademark**
  - E.g., printing a mobile device accessory bearing the logo of the device it is intended to be used with

- **Copyright**
  - E.g., printing objects incorporating a well known cartoon or comic book character or their features

- **Publicity/Privacy**
  - E.g., printing a figurine of a celebrity
But who does the IP owner assert them against?

- Printer manufacturers?
- Individuals printing infringing items for personal use?
- Platform providers
  - Online and brick and mortar maker spaces?
  - File sharing websites?
    - Pirate Bay has already announced that it will host 3D printer design files
  - Other online services?
But who does the IP owner assert them against?

- **Printer manufacturers**
  - Contributory liability?
  - Unlikely to be successful absent encouragement of infringement
  - Look to cases addressing other technologies - Sony v. Betamax, Napster, Grokster
  - 3D printers have substantial non-infringing uses
But who does the IP owner assert them against?

- **Individuals printing infringing items for personal use**
  - Unlikely to be significant deterrent
  - Risks alienating customer and fan base
  - Look to RIAA lawsuits, which targeted teenagers and stay at home moms
    - Suing your customers generally not good for business!
Protecting IP in A 3D Printing World

- But who does the IP owner assert them against?
  - **Platform providers** - online or brick and mortar maker spaces – *printing items*
    - IP owners will probably have most success here
    - Manufacturing of infringing articles that are sold to customers clearly an infringement
    - Should be relatively straightforward to get maker space to stop printing these items, particularly if located in the US
    - Likely that many providers of maker spaces will set up shop or move to a jurisdiction where enforcement is difficult
Protecting IP in A 3D Printing World

- But who does the IP owner assert them against?
  - **Platform providers** - online maker spaces / File sharing sites – *hosting of the files*
    - files to create infringing items
      - But does the file itself constitute an infringement?
      - No case law but can analogize to other electronic files at least for trademark and copyright
        - Can see a trademark when view the file in CAD software just like in an image or video file
        - Can see the copyrighted work when view the file in CAD software, just like can see copyrighted image or video through browser/computer/device
      - Indirect infringement arguments may be more successful
Indirect Infringement / Vicarious Liability

- Active Inducement
  - Inducer intended to induce acts of infringement (actual knowledge of patent, trademark, copyright or willful blindness to its existence)

- Contributory Infringement
  - Requires showing of a sale or offer for sale of a “component” of the patented invention
  - Is a digital file a “component” of a patented invention?

- Future theories
  - “Direct Digital Infringement” proposes direct infringement could be based on sales or offers to sell of the digital data files
Facts:
- Digital files containing 3D models of a person’s teeth were sent to Pakistan and finalized
- Downloaded onto servers in Texas, and later used to 3D print tooth aligners
- Invisalign argued that the digital files infringed their U.S. patents

Holding:
- International Trade Commission determined it had the authority to block the infringing digital files

On Appeal:
- Federal Circuit held that Section 337 limits the ITC’s jurisdiction to physical articles
Enforcement Challenges

Difficult to track down individual infringers.

Forced to bring dozens or hundreds of separate infringement suits in different jurisdictions.

Going after the company supplying the digital file or the 3D printer is not an easy solution.
Finding Infringers

- Physical sale/distribution of infringing articles
  - Difficult – how do you know if the infringing article was created by 3D printing if its an exact copy?

- Online creation / distribution of infringing articles
  - Patent
    - Difficult – must know exactly what to look for
  - Trademark and copyright
    - Much easier
    - Infringing articles typically described using the trademark or copyrighted content
What have we seen in the real world?
- Not much yet (as far as we can tell)
- Mostly in online maker spaces
- Copyright and trademark
  - **Games Workshop** – Sent DMCA takedown notice to Thingiverse when a fan of the game Warhammer 40,000 decided to design a couple of his own Warhammer-style figurines and posted the files for free downloading. Thingiverse promptly removed the files.
  - **Square Enix** – Sent takedown notice to Shapeways regarding Final Fantasy Four figurines created by Shapeways users and offered for sale on Shapeways. Shapeways removed the figurines and associated files.
- Fact that design files can be used to create the objects through the maker space may encourage compliance by platform providers with takedown requests.
Protecting the Digital Design File
“[W]arehouses will shift from physical to digital, as the designs of spare parts are stored in vast libraries for future on-demand printing.”

- USPS Office of Inspector General, Oct 2015
Trade in Digital Models

Beats Pill 2-0 Wireless Speaker Red 3D model

$49.00

Available formats:
- 3D Studio (.3ds): 4.26 MB
- Cinema 4D (.c4d): 4.83 MB
- Maya (.ma, .mb): 5.79 MB
- Lightwave (.lw, .lws): 4.71 MB
- Autodesk FBX (.fbx): 6.44 MB
- OBJ (.obj): 5.09 MB
- Alias/WaveFront Material (.mtl): 5.28 MB
- 3ds Max (.max) (2 files):
  - Version 2006, Renderer Default (Raytrace)
  - Version 2006, Renderer V-Ray

Looking for different format?
- Contact for free file format conversion

More details
Trade in Digital Models

United States Design Patent
Brunner et al.

Patent No.: US D709,861 S
Date of Patent: Jul. 29, 2014

FIG. 1

Beats Pill 2.0 Wireless Speaker Red 3D model

FIG. 6
BMW v. Turbosquid, Inc.

Patent No.: US D724,495 S
Date of Patent: ** Mar. 17, 2015

(54) VEHICLE, TOY, AND/OR REPLICAS THEREOF

Settled – all BMW images removed from Turbosquid
Other IP-related risks from 3D printing
Protecting IP in a 3D Printing World

- Reliance on digital files and internet connectivity creates vulnerabilities
  - Potential for theft of design files
  - Potential for poisoning of the supply chain
  - Attacker could alter design files
  - Attacker could insertion problematic instructions to printers
    - E.g. printing 1000x too many products
Protecting IP in A 3D Printing World

- Reliance on digital files and internet connectivity creates vulnerabilities
  - Attacks could result in significant costs to IP owners
  - Creation of unusable parts/products
  - Distribution of faulty/substandard products will harm the brand reputation
  - Costs for systems, processes and resources to detect damaged or altered files or instructions
Protecting IP in a 3D Printing World

- Reliance on digital files and internet connectivity creates vulnerabilities
  - Could result in physical harm/loss of life
    - Creation of malformed parts used in machinery/vehicles
    - Creation of malformed pharmaceuticals
    - Creation of malformed implants/medical devices
  - Cybersecurity will be more important than ever