

Module 3 - Patent

Patent in 3D printing

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HEARTHANDS SOLUTIONS

Authored by: Elena Aristodemou

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REFERENCED DOCUMENTS

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APPLICABLE DOCUMENTS

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1. Patent

1.1 Learning Outcomes

This module will clarify all the terms and concepts revolving around patents, their acquisition, and their implications in the market. Through detailed information on Intellectual Property (IP) protection, learners will understand the importance of registering a patent when creating new or unique products, especially when it comes to 3D printing.

After completing this module, you will be able to:

- Distinguish inventions from other works
- Understand the importance of patents
- Learn the steps to follow when disclosing an invention
- Safeguard your rights of manufacturing/using/distributing your proper invention on the market
- Refrain from infringing other people's patents

Estimated seat time: 3 hours

1.2 Main Content

Please provide your content here. Include definitions, explanations, practical examples and case studies/success stories. The main content (not the whole document!!!) shall be around 10 A4 pages.

1.2.1 Terms and Definitions

Invention is

- A “unique/novel device, methods, composition or process” (McKinney, 2016).

Inventor is

- A person who creates/discovers an invention

Invention Protection

- Is the legal protection for inventions through granting patents.

Patent is

- An exclusive right granted for an invention, an inventive idea or an inventive process

Patent Law is

- The law that protects the legal rights of the owner of an invention/ an inventive idea or a process and its usage rights.

Patent law defines three types of patents:

1. Design Patent
 - Is the legal protection accorded for designs to protect creations of designers and manufacturers (may apply for portions of a product and/or the product as a whole).
2. Utility patent
 - Is the legal protection enforced to prevent the unauthorised distribution of digital files that facilitate counterfeit printing.
3. Plant Patent
 - The legal protection for newly engineered plant species or strains.

The patent Registration Process is

- The process that includes the following steps:
 1. Patent *Application* at the local Patent Office (i.e. *European Patent Office(EPO)* for Europe)
 2. All invention *Details* must be written clearly and concisely ('Invention Disclosure')
 3. The local Patent Office will check for *Patentability Conditions*
 4. The local Patent Office grants the inventor a patent

Patentability/ Patentability Conditions are

- The requirements for granting an inventor a patent: 'European patents are granted for inventions that are new, involve an inventive step and are susceptible of industrial application' (EPO, 2021a).

Inventive step ('non-obviousness' in the U.S.) is

- A patent requirement: the invention must not be obvious to people who know the technical field concerned (EPO, 2021b).

Patent Infringement is

- The unauthorised use/reproduction/distribution of an invention (i.e. without the consent of the patent owner)

1.2.2 Theory behind the IP implementation

Intellectual Property (IP) rights protect novel and unique works or creations and determine the rules under which said articles can be used, reproduced, and/or distributed. Specific laws define protection and apply to localities by implementing relevant directives. One of the IP concepts that can offer legal protection to original works is patent. Patents can be valuable in 3D printing and in fighting 3D printed counterfeits.

Patents are exclusive rights granted for an invention, an *inventive idea* or an *inventive process* (Ackerman, 2021). The requirements for granting a patent are called *patentability conditions* and include: *novelty*, an *inventive step* and the possibility for *industrial application* (EPO, 2021a). In other words, only *new* and *useful* things can be patented, which, in addition, are *nonobvious* to experts of the technical field concerned (EPO, 2021b). Patents may cover any kind of invention, including *devices*, *methods*, *compositions* or *processes* (McKinney, 2016). In this context, even digital files for 3D prints can be protected, provided that their owner files for and is granted a patent.

The registration of a patent begins with an application to a local Patent Office (e.g. the EPO for Europe). Then, clearly and concisely, the person or entity concerned minutely describes their invention in writing ('Invention Disclosure'). The local Patent Office checks if the invention fits the patentability conditions and, if it does, the inventor is granted a patent. After that, the holder of the patent possesses exclusive rights for the respective invention. Accordingly, patent infringement occurs when a third party uses, reproduces or distributes a patented invention without the patent owner's consent.

Patent laws can protect different kinds of patents like *Design Patents* and *Utility Patents* (Venable LLP, 2021). This is especially important for 3D printing, as they provide the grounds for safeguarding both the appearance and the technological features or function of a product respectively. By claiming every possible detail or even the method for manufacturing a product via 3D printing, owners can enhance their protection against counterfeiters with easy access to 3D printers (Venable LLP, 2021). Digital files are especially vulnerable to infringement,

Even after being granted a patent, holders must be vigilant. An approved patent has a "finite lifetime" and, subsequently, needs to be maintained by the patent holder (Ackerman, 2021). Accordingly, the patent holder must pay periodic fees for patent renewals, as well as keep track of the usage of their patent to keep up with competitiveness. The costs of the whole process vary and depend on the country or countries where the patent is filed. However, even with maintenance concerns and costs, withholding a patent is the safest way to protect one's invention from counterfeits and bad intentions.

IP laws present several gaps or limitations in a constantly evolving technology like 3D printing, but established legal precedents help the legal infrastructure evolve as well. IP awareness can help

societies tackle the counterfeiting epidemic and promote creativity and fair use to ensure progress and equity in a shifting world.

1.2.3 Practical examples

The following article provides 15 examples of “patents that changed the world” (Bennett, 2018):
<https://www.popularmechanics.com/technology/design/g20051677/patents-changed-the-world/>

1. Magnetic Levitation/Maglev
2. iPhone
3. Motorized Exoskeleton
4. Quadcopter Drone
5. 3D Printer
6. Bionic Eye
7. Global Positioning System
8. CRISPR Gene Editing
9. Brain Implant
10. Graphene
11. Bluetooth
12. Self-Driving Car
13. Solar Panel
14. Third Generation Wireless Mobile Telecommunications (3G)
15. Virtual Reality

1.2.4 Case studies

Lego Patents

<https://www.smithsonianmag.com/innovation/how-lego-patents-helped-build-toy-empire-brick-by-brick-180971429/>

The Danish toy company has been patenting its products and integrated systems for decades. From its initial patented ‘LEGO toy building brick’ patented in 1961, the company has built a huge toy empire that never ceases to be relevant: it constantly expands its line and keeps it current with consumers (Kindy, 2019).

Apple vs. Samsung

<https://www.nytimes.com/2018/05/24/business/apple-samsung-patent-trial.html>

Samsung paid \$539 Million worth of damages to Apple for copying a patented smartphone case.

This case has revealed how “design patents can be a valuable tool in fighting 3D printed counterfeits” (Venable LLP., 2021)

1.3 Knowledge Assessment

Quiz-like assessment based on the main content. Please mark the correct answer with bold when required. Include 10 questions for your module. Increase gradually the level of difficulty.

Question 1 (multiple choice or true/false): Who is an inventor?

[the person who commercialises someone else's invention 1] **[the person who creates/discovers an invention 2]** [the person who manufactures someone else's invention 3]

Question 2 (multiple choice or true/false): What is a patent?

[an exclusive right granted for an invention 1] [an invention's design 2] [a process granting you unique rights 3]

Question 3 (multiple choice or true/false): What is 'patent registration'?

[the process to follow when disclosing an invention 1] [an inventor's legal rights 2] [a complaint made for counterfeited products 3]

Question 4 (multiple answers correct): What is 'patent infringement'?

[the unauthorised reproduction of an invention 1] **[the unauthorised distribution of an invention 2]** [a creation that does not fit the patentability requirements 3] [un disclosed invention 4]

Question 5 (multiple answers correct): Who grants patents?

[EUIPO 1] [local governments 2] [municipal offices 3] **[a local Patent Office 4]**

Question 6 (multiple answers correct): What is the 'inventive step'?

[the first idea coming to an inventor's mind 1] [the manufacturing of a novel product 2] **[a criterion for granting a patent 3]** **[a 'non-obviousness' clause for inventions 4]**

Question 7 (multiple answers correct): What can a 'design patent' protect?

[the colours of the product 1] [the process of manufacturing a product 2] **[portions of a product 3]** **[the product as a whole 4]**

Question 8 (matching): Match the terms with their definitions.

Term 1 invention: unique or novel devices/methods/compositions/processes

Term 2 patent: an exclusive right granted for an invention

Term 3 patent registration: the process to follow when registering an invention

Term 4 patent infringement: the unauthorised use/reproduction/distribution of an invention

Term 5 patentability: the requirements for granting an inventor a patent

Question 9 (matching): Match the concepts with their explanations.

Concept 1 inventive step: the 'non-obviousness' of an invention

Concept 2 novelty: State of the art

Concept 3 disclosure: the clear and concise way to apply for a patent at your local patent office.

Concept 4 registered invention: a patent entitled to exclusive rights

Concept 5 ownership: the state of creating something novel or unique and holding its exclusive rights

Question 10 (matching): Match the problems with their solutions.

Problem 1 I have created a novel type of bicycle. Should I disclose it to the public via the media? : No, you should first apply for a patent to safeguard your exclusive rights over the invention

Problem 2 I have copied the idea of a smartphone invented by another inventor, but I made mine look slightly different. Can I register a patent for it? : No, your product must be unique or novel.

Problem 3 I have thought of a new philosophical approach to loneliness. Can I register a patent for it? : No, your invention must be industrially applicable to qualify for registration.

Problem 4 I have a novelty idea, but I need more time to develop my product. How can I prevent other inventors from stealing my idea? : You register a patent for your idea and you are accorded exclusive rights for a certain period to develop your invention.

Problem 5 I am a patent holder in my country. How can I sell my product to another country without fear of counterfeits? : Patents are territorial rights and must be filed and granted in any country or region to be valid.

1.4 Skills Assessment

Assign an exercise that promotes problem solving and critical thinking related to the actual implementation of Intellectual Property in STEAM subjects.

X has designed a unique mechanism for operating a crawler crane that is printable on a 3D printer. X then registered a patent for both the digital file and the printed object. Y copied X's mechanism by stealing the 3D file, maintaining the function of the mechanism but completely changing the

appearance of the printed object. Y then introduced the counterfeit to the market. What can X do to defend their rights? Is X able to seek redress from Y for the unauthorised use of the 3D print file?

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Please use [APA Style](#) to write down your references.

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