

## 3-D PRINTING - A THREE DIMENSIONAL ATTACK ON IP

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### ABSTRACT

*3D printing technology has abruptly emerged as the next innovative technology of the current era with sufficient impetus to renovate almost all facets of society. This technology has a potential to make a large number of copies to deprive the IP owners of their substantial revenues. Copyright law has turned up with measures like Technology Protection Measures and Internet Service Provider liability to fix the liability for infringing copyrighted works through a platform like internet. This article tries to understand what would constitute an intellectual property right infringement by using 3D printing. An emphasis is put on the recent trends in patent law particularly the repair-reconstruction doctrine under various jurisdictions to analyze infringement using 3D printing.*

### INTRODUCTION

Three-Dimensional Printing is a three decade old technology that is rivetingly entering the mainstream, with a huge ripple effect. The photocopier is used to copy documents. With the advent of digital technologies and internet, copying of literary works, music and films has become rampant. To give an escalation to this, 3D printing technology facilitates making of three dimensional objects. The copies can be produced in large-scale to potentially deprive the IP owner of substantial revenues. Patents will thus have even more trouble with 3-D copies than copyright law had with digital music sales.

In such circumstances it will be a great challenge to find out the infringers of the patented object. A registered design is infringed where an article is made without the license of the owner of the design provided that the article is identical or substantially similar in overall impression to the registered design. In copyright law, many internet 3D printing companies permit a consumer to

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upload a 3D printing make file and have it printed. Without proper safeguards on the end of the printers, they could run into copyright infringement issues if the design is subject to a copyright. 3D printing also allows anyone to copy a trademarked good or slap a trademark on a product. Similar difficulties exist for copyright and especially for patent. Patent law and copyright often merge in the context of 3D printing since physical and tangible objects can now be copyrightable due to compression into mere sequences of code that one can download and distribute.

By using 3D printer anyone can make anything with wide varieties of materials like plastic, glass, metal, polymers, human tissue, wax, edible food, sand etc. In such circumstances it will be a great challenge to find out the infringers of the patented object. There needs to be some mechanism to address these issues precisely.

## **UNDERLYING TECHNOLOGY**

3D printing technology has abruptly emerged as the next innovative technology of the current eon with sufficient impetus to renovate almost all facets of society. By using 3D printer anyone can make anything with wide varieties of materials like plastic, glass, metal, polymers, human tissue, wax, edible food, sand etc.<sup>2</sup>

The concept of 3D printing has been used for several decades. It was Chuck Hill who designed and developed a process of solid imaging, also known as stereo-lithography in the mid 1980's. This technology utilized a concentrated stream of ultraviolet light to cure and solidify layers of material to slowly create tangible objects in three-dimensions. Since then, additive manufacturing has evolved into a more efficient process that allows users to create physical objects in hours rather than days. The design of these physical objects, however, begins with a CAD file, or computer-aided design file. CAD files can be created from scratch using simple 3D modeling software available online, or created through complex 3D scanners that record object dimensions from several angles. Simply put, CAD software creates cross-sections of the design object to create more print-accessible components, creating a compressible and downloadable digital blue-print of sorts. CAD files can be distributed and downloaded as complete designs from several online open source domains such as Thingiverse or Piratebay that offer these digital

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<sup>2</sup> <http://biotech3d.blogspot.in/2015/01/3d-printing-new-era.html> (Jan 14, 2015)

renderings of tangible objects for free. Other 3D printing resources, like Shapeways, offers a marketplace for consumers to buy and sell objects through the 3D printing capabilities of the company itself, rather than sharing digital files of the objects and designs. Just as an individual could search, locate, and download a contemporary hip/hop song for free online, individuals can now acquire the digital foundations of physical objects with similar ease<sup>3</sup>.

In 2014, key patents that prevented competition in the market for the most advanced and functional 3D printers have expired. These patents cover a technology known as “laser sintering,” the lowest-cost 3D printing technology. Because of its high resolution in all three dimensions, laser sintering can produce goods that can be sold as finished products.<sup>4</sup> Although a lot of patents related to this industry had already expired, the patents that protected fundamental methods and research were active till 2014. So it was a very important year in this respect. Key patents related to 3D printing technology expired in the year 2015 has thus given rise to explosive demand, lower prices and a larger scope for technology betterment.<sup>5</sup>

## **ADVANTAGES OF 3D PRINTING**

3D printing removes many constraints associated with the traditional manufacturing processes. Manufacturers can incorporate innovative designs and functionality in their products even while cutting down both operational costs and the time to market. It significantly enhances creativity. When very complicated designing is involved in a product that has to be manufactured fast and in relatively low numbers, 3D printing is useful. Highly creative products can be manufactured much faster. 3D printing is proving to be beneficial in healthcare. In medical cases like brain tumour or hole in the heart, a 3D print of the organ give vital clues to help doctors plan their surgeries more accurately.<sup>6</sup>

## **THREAT TO IP LAW**

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<sup>3</sup> Mendoza, Alexander J., "Legal and Social Implications of the 3D Printing Revolution", (2015). CMC Senior Theses. Paper 1032,p.4. Accessed from- [http://scholarship.claremont.edu/cmc\\_theses/1032](http://scholarship.claremont.edu/cmc_theses/1032) (Dec 23, 2014)

<sup>4</sup> <http://qz.com/106483/3d-printing-will-explode-in-2014-thanks-to-the-expiration-of-key-patents/> (Dec 20, 2014)

<sup>5</sup> See <http://3dprinting.com/news/expiry-of-patents-in-3d-printing-market-to-decrease-product-costs-and-increase-consumer-orientation/> (Jan, 10, 2015)

<sup>6</sup> <http://www.thehindu.com/business/Industry/3d-printing-moving-to-mainstream/article7467217.ece> (Jan, 14, 2015)

Each printed copy of an invention is a lost potential sale to the patent holder. But, to sue for infringement, the patent owner would need to be aware that someone is using a 3D printer to make the patented invention. And that's a very formidable task since these printers are widely dispersed across households and businesses. IP laws have characteristically lagged behind new technologies, persuading the courts to fashion old laws to situations that were not envisioned when they were created. Under patent law, purchaser of patented product acquires a series rights like right to use and repair of the object. The repair and reconstruction doctrine of patent law visibly did not reveal that consumers could cheaply and easily 3D print replacement parts for a variety of components.

Another crucial issue is to fix liability on an infringer. In infringements through internet, the copyright law had undergone amendments to introduce Internet Service Provider (ISP) Liability. It is questionable whether the patent law could introduce such a concept with the advent of technology like 3D printing. It can be imagined that the hands behind the 3D print models will wish no liability for the infringements done through its database. According to the Digital Millennium Copyright Act (DMCA), a copyright owner may have infringing material taken down by sending notice to a content host, such as YouTube. It is dubious if the patent law could be amended to accommodate provision of a patent notice and takedown system like that recognized by the DMCA.

## **ADVANCE IN 3D PRINT TECHNOLOGY AND ITS DISRUPTIVE POTENTIAL IN PATENT LAW**

Copyright law has turned up with measures like Technology Protection Measures and ISP liability to fix the liability for infringing copyrighted works through a platform like internet. Many articles have addressed the legal issues behind 3D printing. Apart from product liability, the main issue was 3D printing and the "making" permissible under patent law. Wilbanks Kelsey has carefully analysed the repair- reconstruction doctrine of the US Patent law in her article<sup>7</sup>. 3D printing technology begins with a digital 3D blueprint design otherwise CAD (computer aided design). Users can create CAD files by scanning objects with a 3D scanner or by drawing objects

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<sup>7</sup> Wilbanks, Kelsey, "The Challenges of 3D Printing To The Repair-Reconstruction Doctrine in Patent Law", George Mason Law Journal, 2013.

manually on a CAD program. After, the file sends to 3D printer its contents are sliced into “layers”, ready for printing. 3D printer releases material substances onto a base to build an object upward, layer by layer. After the layers are set, they are fused together and the object is further changed into solid form.

3D printers of the future also maintain the possibility of self-replication, or the ability to print an identical printer. 3D printing has the potential to both amaze and simplify; from creating objects as complicated as working camera lenses, clothing garments, acoustic guitars, and lethal firearms, to objects as simple and useful as a plastic replacement hinge for baby strollers.<sup>8</sup> The cost of replicating products has decreased and the manufacturing process has become easier to be accomplished. To make products, business owners and individuals may not need to purchase intricate machines and equipment or to possess extraordinary skills. They can print the products using 3D printers based on 3D digital model files or 3D blueprints. The only resources they need are the raw materials required by the 3D printers.

The copyright issue is quite similar to *Napster*<sup>9</sup> and the fight between the music industry and peer to peer sharing sites. However, 3D printing adds an additional twist. Not only are 3D printing make files widely available for download, but there is the additional step of actually printing the potentially copyrighted design. Thus, there could be multiple layers of copyright infringement if consumers and companies are not vigilant. In the long run, 3D printing has the ability to completely shudder intellectual property to its core, as it diffuses the means of production and flouts many of the assumptions on which present IP laws are based<sup>10</sup>. It begets a huge financial loss on IP assets.

## **LAW IN THE UNITED STATES OF AMERICA**

### **COPYRIGHT AND DESIGN**

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<sup>8</sup> Supra note 4 , at p.6.

<sup>9</sup> A & M Records, Inc. v. Napster Inc., 239 F.3d 1004.

<sup>10</sup>Finocchiaro, Charles. "Personal Factory or Catalyst for Piracy?" *Cardozo Arts and Entertainment Law Journal* 473 (2013): 4.

Section 102 of U.S. Copyright Law<sup>11</sup> includes ‘pictorial, graphic and sculptural works’ among other original works of authorship protected as soon as fixed in a tangible medium of expression. ‘Pictorial, graphic and sculptural works’ are further defined as 2D and 3D works of fine, graphic, or applied art as long as their form and not their mechanical or utilitarian aspects are concerned.

Section 106 of the US Copyright Law confers exclusive right to the Copyright owner in respect of the works laid down in it. It includes works like artistic and sculptural works, which could be printed using a 3D printer<sup>12</sup>. Copyright is still important in the context of 3-D printing, as the devices can be used to create works of authorship like sculptures and figurines, and the computer-aided design (CAD) files from which objects are printed may also be protected by copyright.<sup>13</sup>

Under copyright the general exceptions from infringement envisaged is applicable in the case of 3D printing also. §107 sets out the limitations on exclusive rights (Fair use)

“Notwithstanding the provisions of sections 106 and 106A, the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include—

1. the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
2. the nature of the copyrighted work;
3. the amount and substantiality of the portion used in relation to the copyrighted work as a whole and
4. the effect of the use upon the potential market for or value of the copyrighted work.

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<sup>11</sup> Title 17, U.S. Code

<sup>12</sup> 17 U.S.C. § 106(5) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and pictorial, graphic, or sculptural works, including the individual images of a motion picture or other audiovisual work, to display the copyrighted work publicly;

<sup>13</sup> <http://www.slj.com/2015/05/technology/3-d-printing-understanding-copyright-fair-use-and-more/#>

The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors.

If a court determines that parts of the file are protected by copyright, then copying that file without permission will be copyright infringement. If there are no copyrightable elements of the file, then, as with the file generated by a scanner, anyone would be free to copy the file.

One way to protect against infringements facilitated by 3D printing is to apply for industrial design registration, which protects aesthetic features of utilitarian products. Although the scope of protection excludes functional components, visual aspects like shape, configuration, and ornamentation would be protected. Industrial design infringement is only triggered when a copy is produced that is nearly identical in both look and feel. Through even slight customization, consumers can avoid infringement. Consequently, rights-holders must either anticipate potential points of customization and apply for protection of a range of variations, or only protect the components that are unlikely to be altered.<sup>14</sup>

## **TRADEMARK**

Users can easily circumvent infringement by removing the trademarked name or logo from products before printing. A more complex issue arises when the trade dress or distinguishing guise of a product, free of any mark, has acquired a secondary meaning that is clearly indicative of its source. However, the Trademarks Act generally requires “use” of the mark in the commercial sense<sup>15</sup> in order to constitute an infringement. Therefore, it is conceivable that using a 3D printer to replicate trademarked goods for personal use may not be actionable under the statute.

## **PATENT LAW OF THE USA – THE REPAIR-RECONSTRUCTION DOCTRINE**

The U.S. patent law system recognizes a doctrine of repair and reconstruction. After the sale of a patented product authorized or manufactured by the patent owner, or the patent expires, a user

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<sup>14</sup> <https://www.gowlings.com/KnowledgeCentre/article.asp?pubID=3583>

<sup>15</sup> “...uses in commerce any word, term, name, symbol, or device, or any combination thereof”. See § 43 (15 U.S.C. § 1125)

can freely use the patented product. If the any component of the patented product breaks or fails, the user may need to repair or replace the broken or failed component. Based on the doctrine of repair and reconstruction, the user or a repair can maintain the normal functionalities of the patented product by repairing or replacing the component. The conduct is a legal repair, as far as the repaired or replaced component itself is not covered by any claim of the patent or covered by another patent directed to that component. If the repair or replacement is out of certain extent and effectively makes a new product, the conduct can constitute an illegal reconstruction.

After a certain point, patent holders may be able to ascertain that a ‘reconstruction’ rather than just a ‘repair’ has incurred, warranting possible patent infringement. Unfortunately, the distinction between a legal repair and an illegal reconstruction is faint, if at all present. The present condition of the repair-reconstruction doctrine, however, provides little direction as to what would be considered a clear infringement of repair standards, and is in urgent need of clarification from higher legal courts.

According to Article 1, Section 8 of the US Constitution, anyone “without authority who then makers or uses...any patented invention...during the term of the patent...infringes on the patent” as consequence<sup>16</sup>. As a result, when an object incurs damages that are beyond home remedy, patent law mandates that an individual purchases a new product entirely to resume further use. Actions contrary to this are considered an unwarranted reconstruction of a product, or repairs so extensive as to constitute “a new article” entirely. This stipulation is active even if a consumer is unaware of particular patents or potential patent infringement. But what if a consumer uses a home 3D printer to replace many minor components of a product over a long period of time? Existing legal precedent clarifies the extreme ends of the repair- reconstruction debate, but leaves tremendous gray area that 3D printing technology is likely to emerge. To fully comprehend how this deficit in precedent will affect 3D printing, however, we need to take a closer at the history of the court’s treatment of this legal doctrine through its many inconsistent interpretations.

The first known legal encounter dealing with the repair versus reconstruction quandary occurred more than a century ago, emerging within the case of *Wilson v Simpson*<sup>17</sup>. Wilson, the defendant, had repaired blade cutting components of his legally purchased and patented wood-cutting

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<sup>16</sup> 35 U.S. Code § 271

<sup>17</sup> *Wilson v. Simpson* 50 U.S. 109 (1850), <https://supreme.justia.com/cases/federal/us/50/109/> (Dec 27, 2014).

machine, against the intentions of the actual patent owner of the machine. In response, the Court found that because the knives themselves were a temporary and exhaustive component of the machine as a whole, the defendant's replacement of the knives (without permission of the patent owner) was justified because this addition did not significantly modify the use and intention of the machine as a whole. The Court went on to stress the exhaustive lifespan of the knives, stressing that a replacement in this domain would not stray from the object's original use.

The Court declined to create a bright-line rule, but in finding permissible repair, it emphasized the replacement part's limited life and the patent holder's intent.<sup>18</sup> Thus, the cases in the future regarding similar legal situations would have to apply a more circumstantial analysis.

The closest the courts have come to creating a true guideline for the repair-reconstruction doctrine emerges during *Aro Manufacturing Co. v. Convertible Top Replacement Co*, eventually building a guideline around earlier court's reluctance to build a bright-line standard. In *Aro*, a defendant was faced with an accusation of unlawful reconstruction and replacement of a fabric cover for a convertible car, where the fabric was part of a larger combination patent<sup>19</sup>. Combination patents often cover multiple functioning components of an overall object; in this case, the supporting structures, sealing mechanisms, and fabric cover itself.

The Court handed down a significant ruling, claiming that the replacement of the fabric component was a lawful repair, stating that "no element...that constitutes one of the elements of a combination patent is entitled to patent monopoly"<sup>20</sup>. Further, the Court made an important distinction in that the "mere replacement of individual...parts, one at a time, whether of the same part repeatedly or different parts successively, is no more than the lawful right of the owner to repair his property". In the opinion of the Court, an unlawful reconstruction of an object only occurred when it was used to "make a new article" altogether, after the expected life of the original product had come to pass<sup>21</sup>.

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<sup>18</sup> Kelsey B. Wilbanks, *The Challenges of 3D Printing to the Repair-Reconstruction Doctrine in Patent Law*, 20 Geo. Mason L. Rev.4, 1147, (2013)

<sup>19</sup> *Aro Mfg. Co., Inc. v. Convertible Top Co.* 377 U.S. 476 (1964). Can be accessed from <https://supreme.justia.com/cases/federal/us/377/476/case.html> (Dec 27, 2014)

<sup>20</sup> *Ibid.*

<sup>21</sup> *Supra* note 8, (Kelsey), 25.

Kelsey cited *Aro I* case in regard to analysis of repair –reconstruction doctrine where the main issue was whether the replacement of fabric car’s unpatented convertible tops constituted infringing reconstruction? And court held that replacement of unpatented spent fabric was permissible repair. And further she quoted the concurrence by Justice Brennan and Justice Black. Throughout her article we could see that influence of Justice Brennan’s test of multiple factors, such as the intent of patent holder and user as well as the life , importance , and cost of the part replaced in relation to the patented whole. She totally ignored Justice Black. But Justice Black had made a good concurrence as he said entirely against Justice Brennan’s view. According to Justice Black, scope of patent should never depend upon the psychoanalysis of patentee or purchaser. Kelsey has not discussed the relevant parts of many quoted cases especially she used to suggest combination patent with unpatented parts cases that may be for her convenience to explain it in her own view or she is not aware or haven’t clarity in these cases. Though the US Law on Patents set the repair –reconstruction doctrine it is pretty ambiguous when it is to be applied to new technologies. Thus, the courts should invigorate their proposition of this doctrine to accommodate new technologies.

The upcoming shift in replacement-part industry as a result of growing popularity of 3D printing necessitates redefined the repair and reconstruction in patent.<sup>22</sup> Under patent law, purchaser of patented product acquires a series rights like right to use and repair of the object. There is a great issue of ambiguity in Repair-Reconstruction i.e. what will amount to legal repair and illegal reconstruction? How consumers can predicts outcomes before stepping to the courts? These are the main challenges of 3D printing. But these all are quiet common and existing problems in repair reconstruction area of patent and even before the advent of 3D printing technologies consumers were unpredictable about these factors because of the same vagueness. Even though there is problem of vagueness one of the main issues will be the chain of infringement.

## **THE UK POSITION**

### **COPYRIGHT LAW**

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<sup>22</sup> Kelsey B. Wilbanks, *The Challenges of 3D Printing to the Repair-Reconstruction Doctrine in Patent Law* , 20 Geo. Mason L. Rev.4, 1147, 1148(2013)

Copyright gives a bundle of rights to the rights owner to prevent other people from copying, using or exploiting their works which involved intellectual creation. UK copyright comes into existence automatically when the relevant work is created. An object may be protected by copyright where it can be classed as an “artistic work” and specifically protects “sculptures” and “works of artistic craftsmanship”<sup>23</sup>. Attempts to rely on copyright to protect functional objects before the UK courts have been largely unsuccessful.

The following have been found not to be sculptures: (1) moulds for making cartridges<sup>24</sup>; (2) a model of a dental impression tray<sup>25</sup>; (3) a Stormtrooper helmet<sup>26</sup>. Equally, It is difficult to successfully assert an article is protected as a work of artistic craftsmanship<sup>27</sup>. A prototype for a sofa was found not to be protected by copyright as a work of artistic craftsmanship. Works found to constitute works of artistic craftsmanship have included: hand knitted woollen sweaters and pottery. Original pieces of handcrafted jewellery are also likely to be protected as works of artistic craftsmanship. Even where the form of an object is not protected by copyright, it may be possible to rely on copyright in the object’s surface design to prevent copying<sup>28</sup>. For example, the graphic design for the surface decoration of a badge has been found to be protected by copyright<sup>29</sup>. The design had an existence independent of the badge to which it was applied, i.e. the design could be applied to the surface of other articles.

## DESIGNS LAW

Designs rights will often be the most useful form of intellectual property rights for the purposes of challenging 3D printing. They are the right most readily found to subsist in everyday objects. Commercial reproduction using 3D printers could well amount to design right infringement. Intention and knowledge that actions amount to infringement are irrelevant. However, there will be no infringement where an act is done privately and for purposes which are not commercial.<sup>30</sup>

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<sup>23</sup> Section 4, Copyright, Designs and Patents Act 1988.

<sup>24</sup> *Metix v G H Maugham* [1997] FSR 718.

<sup>25</sup> *J & S Davis (Holdings) v Wright Health Group* [1988] RPC 403

<sup>26</sup> *Lucasfilm Ltd v Ainsworth* [2011] UKSC 39.

<sup>27</sup> *George Hensher Ltd v Restawhile Upholstery (Lancs) Ltd* [1976] AC 77

<sup>28</sup> Section 51(3) Copyright, Designs and Patents Act 1988.

<sup>29</sup> *The Flashing Badge Company Ltd v Brian Groves* [2007] EWHC 1372 (Ch) (14 June 2007)

<sup>30</sup> For UK registered design, see section 7A(2)(b) Registered Designs Act 1949; for UK unregistered design, see section 226(1) Copyright, Designs and Patents Act 1988; for EU design rights, see Article 20(1) Community Designs Regulation 6/2002.

Therefore, if an object is copied by an individual in his home for his own personal use, there will be no infringement. The situation will be different if the private individual sells the item that was printed. This would constitute infringement.

## **TRADEMARK LAW**

A commercial 3D printing service would be using the trade mark in the course of trade when reproducing a rights holder's trade mark on a printed object. This is likely to amount to infringement. Intention and knowledge that actions amount to infringement are irrelevant. As for design law, for there to be an infringement, the trade mark must be used "in the course of trade"<sup>31</sup>. Where a private individual prints an object which includes a registered trade mark, it is unlikely that they will be doing so "in the course of trade" unless they then go on to sell what they have printed.

## **PATENT LAW**

The law of UK whereby making of a patented product is infringement or not is dealt under Section 60(1) (a) of the Patents Act 1977. The earlier decision of the House of Lords in *United Wire Ltd v Screen Repair Services (Scotland) Ltd*<sup>32</sup>, in *United Wire*, infringement was found to have occurred by replacing two wire meshes attached to a frame where the combination of the two wire meshes and frame was patented. In that case the test was whether:

- (i) the replaced part was integrally connected to the retained part, so that work included a significant element of demolition,
- (ii) the replaced part was subjected to significant improvement work,
- (iii) the inventive concept either largely resided in the replaced part or was closely connected to that part, and
- (iv) the work involved could undoubtedly be described as manufacture.

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<sup>31</sup> Section 10(2) Trade Marks Act 1994 and Article 9(1) Community Trade Mark Regulation.

<sup>32</sup> [2000] 4 All ER 353

Now, the UK position is the ruling in *Schütz v Werit*<sup>33</sup>, where, the replacement of a part of a product protected by a patent will constitute a non-infringing “repair” rather than an infringing “making” of the patented article. This dispute involved replacement parts consisting of plastic bottles patented intermediate bulk containers. Merely replacing a damaged plastic container with a new plastic container was regarded to be an exercise of a very different order. This latest case does appear to have shifted the law in favor of those who repair and recondition products or supply spare parts. However, it does not give the go-ahead to all such activity.

The Supreme Court in this case suggested the following considerations are looked into ascertain infringement:

- Is the part replaced such a subsidiary part of the patented article that its replacement, when required, does not involve “making” a new article? Even if the replaced part is undoubtedly essential and a physically large part of the patented article, the part can still be said to be a relatively subsidiary part of the article, viewed as a whole.
- Does the replaced part have a significantly lower life expectancy than the retained part? In particular, would one anticipate replacing the replaced part several times during the life of the retained part?
- Where an article includes a component that is physically easily replaceable and in practice relatively perishable, those features must constitute a factor.
- Does the replaced part include any aspect of the inventive concept of the patent? The extent to which a component of an article is a subsidiary part, so that its replacement is more likely to involve repairing than “making” the article, must be a matter of degree. Therefore, it is legitimate to consider whether the replaced worn out art includes the inventive concept, or has a function that is closely connected with that concept.
- Is the replaced part a freestanding item of property that does not include, or relate to, the inventive concept?

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<sup>33</sup> [2013] UKSC 16.

However, the Supreme Court said that the issue is by no means clear but the abovementioned factors persuaded them to arrive at that conclusion. The Supreme Court recognizes that such cases will in future be decided on the facts of each case.<sup>34</sup>

The principle articulated here is equally applicable to consumable and therefore ideally replaceable parts for items as different as cars and cartridges for printers. The Supreme Court (the highest Court for England and Wales) found that the making of replacement bottles for placement in large metal cages was non-infringing. In this case, Court allowed the appeal and held that Werit did not infringe Schütz's patent rights by supplying replacing parts.<sup>35</sup> This decision is an apt test for determining innocent repair and to a limited extent replacement as not amounting to infringement.

## INDIAN SCENARIO

The US, the Netherlands, Russia and Italy are leading markets for 3D printers. But, India is fast catching up, with many companies exploring the potential the new technology holds. According to 6Wresearch, the 3D printer market in India is projected to cross \$79 million by 2021.<sup>36</sup> Pandorum Technologies Pvt. Ltd, a biotechnology start-up focused on tissue engineering, has made India's first artificial human liver tissue with the help of 3D printing technology. The tissue performs critical functions of a human liver tissue including detoxification, metabolism and secretion of biochemicals such as albumin and cholesterol.<sup>37</sup>

While the current 3D printing technology is able to make small slices of tissue, producing a complete organ such as the liver with 300 billion cells may take several years, analysts say. As of today, 3D printed living tissues are used for testing drugs in the early-development phase.<sup>38</sup> National Aerospace Laboratories (NAL), India's second largest aerospace firm, has recently demonstrated 3D printed prototypes used for the design and validation of various aerospace components at an exhibition in Bangalore, making NAL one of the latest aerospace organizations

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<sup>34</sup> JA KEmp, "WHAT CONSTITUTES "MAKING" A PATENTED PRODUCT? - SCHÜTZ V WERIT", [http://www.jakemp.com/uploads/files/general-briefings/What\\_Constitutes\\_Making\\_a\\_Patented\\_Product\\_-\\_Schutz\\_v\\_Werit\\_.pdf](http://www.jakemp.com/uploads/files/general-briefings/What_Constitutes_Making_a_Patented_Product_-_Schutz_v_Werit_.pdf)

<sup>35</sup> Ibid. Accessed from <https://www.supremecourt.uk/cases/docs/uksc-2011-0159-judgment.pdf> (Jan 15, 2016)

<sup>36</sup> <http://www.thehindu.com/business/Industry/3d-printing-moving-to-mainstream/article7467217.ece> (Jan 14, 2015)

<sup>37</sup> <http://www.livemint.com/Politics/rivzBlyrJznK1nn2JeKFZK/Pandorum-develops-Indias-first-artificial-liver-tissue-usin.html> (Jan 14, 2015)

<sup>38</sup> Ibid.

to adopt advanced 3D printing and additive manufacturing to develop the next generation of defense and aerospace technologies.<sup>39</sup>

## LEGAL DIMENSIONS OF INDIAN IP LAW

The intellectual property laws of India are too outmoded to cater the needs of recent technology. It does not encompass the repair-reconstruction doctrine like the US law. Infringement in the context of 3D printing would be governed by Section 14(c) (i) of The Indian Copyright Act, 1957. It states that the conversion of a three dimensional work into 2D form and vice versa would be the exclusive right of the author of the artistic work. Therefore, the action of scanning a copyrightable object would appear to be an infringement of the author's exclusive right to convert it into a two dimensional form. Similarly, considering that copyright persists in the CAD file itself, its 3D print itself might therefore amount to infringement of the author's copyright over this file.<sup>40</sup>

Now in India various manufactures offering 3D printers through online market and offline costing Rupees 1, 25000 onwards and spools are also available in India. Consumers can build their own 3D printers with the help from online communities like Riprap, Fab@home for those who are not tech-savvy. Online services like shapeways, sculpteo print and ship the consumer CAD designs submissions. As author said consumer will soon be able to create anything like "as simple as microwaving a potato". Tech world expecting a Bio printing of functional human limbs and organs in 2020 and Global network of industrial-scale 3D manufacturing centres e.g. clothing, electronics in 2025.

The patent holder has exclusive rights for limited times over their creations. This authority also gives right to repair and replacement parts to preserve its useful life. And reconstruction is beyond scope of a permissible uses and it violates the patent owner's right to exclude others. Indian patent act deals with such a provision under section 48 as right of patentees and repair is a legal activity in India. Both Indian and US provisions are made in compliance with the article 28 of the TRIPS. A CAD file will be protected by copyright as an artistic work provided it has a

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<sup>39</sup> <http://www.3ders.org/articles/20151223-indias-national-aerospace-laboratories-3d-prints-prototypes-of-aerospace-parts.html> (Jan 14, 2015)

<sup>40</sup> <http://spicyip.com/2014/01/guest-post-3d-printing-and-indian-copyright-law.html> (Dec 15, 2015)

minimum creativity. However the position is somewhat different when the CAD file is generated by scanning an object. In this case the file will ultimately reflect the characteristics of the object being scanned and therefore would not satisfy this standard. The real copyright in this case vests in the object and not the file.<sup>41</sup>

Although the computer file is called a design, it doesn't fit the legal definition of a design in all cases. S. 2(d) of the Designs Act of 2000 requires that the visual features be applied by an industrial process. The phrase "industrial process" has been interpreted by courts to imply a process carried out on a large scale. Most 3D printing that exists today (which is used mainly for manufacturing) might fit that definition. However, with the advent of portable 3D printers into homes and office spaces, the CAD files used do not fit the definition of designs as per the Act as no large scale application is involved. The solution to this dissonance would probably be to revert to copyright protection as it persists in artistic drawings, on which the designs are based.

The differences between the US, European, and Asian patent regimes are not new to 3D printing. Global companies should be informed of key differences in patent and copyright laws before selling 3D printers or 3D printed end products in multiple countries.

Indian law does not have any doctrine like the Repair – Reconstruction model to set a standard to fix infringement like that in the US patent law. Sec.48 (a) of the Patents Act, 1970 confers right on patentee to prevent third parties from making, using etc. without consent, patented products in India. Repair cannot be considered as "making", though no exception is prescribed in the Act. This provision can be construed as the repair-reconstruction doctrine of US law. Therefore, making can be deemed to be similar to the reconstruction and repair can thus be exempted from infringement. This leaves an ambiguity in new technological advancements. So, an appropriate criterion should be applied to grasp the burgeoning technologies into the clutches of intellectual property law. The probable infringement under the Indian law on Trade Marks is "shape of goods"<sup>42</sup>. In case of trademark the Trade Marks law in India requires a mark to be used in the course of trade to constitute infringement.<sup>43</sup>

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<sup>41</sup> Ibid.

<sup>42</sup> Sec.2(m), Trade Marks Act, 1999.

<sup>43</sup> Sec.29, Trade Marks Act, 1999.

## CONCLUSION

Intellectual Property law is well-designed to fix metes and bounds of current scenario. However, certain technology bewilders the jurists and put them to deliberation to apply these laws to those technologies. 3D printing technology is one such technology which has thwacked all major types of intellectual property with the harbinger of infringement. The current legal line between "repair" and infringing "reconstruction" is a nebulous one. It is proposed that the Supreme Court adopt a redefined standard or set of standards to make the analysis more clear, consistent, and predictable for consumer 3D printer users and patent holders. As 3D printing technology advances, the patent law standard between repair and reconstruction needs to do the same.

The patent law system should also reconsider the foundation of the doctrine of repair and reconstruction. The patent law system should make a distinction between legal repair and illegal reconstruction, by deicing the boundary or standard for the doctrine. As previously mentioned, 3D printing technology is a new impact to the patent law doctrine of repair and reconstruction.

The level of legal clarity in the boundary between the concepts of repair and reconstruction allows consumers to better foresee the legal boundary of 3D printing activities, and allows patent owners to better plan the strategy for technological development and patent right protection. Copyright law has turned up with measures like Technology Protection Measures and ISP liability to fix the liability for infringing copyrighted works through a platform like internet. So, other IP laws particularly patent law should evolve along with emerging trends in technology.