THE RIGHT TO REPAIR

In recent decades, companies around the world have deployed an arsenal of tools – including IP law, hardware design, software restrictions, pricing strategies, and marketing messages – to prevent consumers from fixing the things they own. While this strategy has enriched companies almost beyond measure, it has taken billions of dollars out of the pockets of consumers and imposed massive environmental costs on the planet. In *The Right to Repair*, Aaron Perzanowski analyzes the history of repair to show how we've arrived at this moment, when a battle over repair is being waged – largely unnoticed – in courtrooms, legislatures, and administrative agencies. With deft, lucid prose, Perzanowski explains the opaque and complex legal landscape that surrounds the right to repair and shows readers how to fight back.

Aaron Perzanowski is an expert on ownership in the digital economy and the conflict between intellectual and personal property rights. His research has appeared in leading academic journals. He's the co-author of *The End of Ownership* (2016) with Jason Schultz, and the co-editor of *Creativity Without Law* (2017) with Kate Darling.

The Right to Repair

Reclaiming the Things We Own

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5 REPAIR AND INTELLECTUAL PROPERTY

As we've seen, firms deploy a variety of tools to limit repair and capture its value. So far though, we've postponed discussion of arguably the most powerful of them. Intellectual property (IP) – in the form of copyrights, patents, trademarks, and trade secrets – offers manufacturers an arsenal of weapons in the war on repair. From a practical perspective, IP law allows firms to credibly threaten to enjoin, silence, and ultimately bankrupt anyone with the audacity to repair a product without permission. Rhetorically, IP rights offer a superficially compelling narrative to convince policy makers and the public that repair imperils a vibrant economy and technological progress. IP, the argument goes, provides essential incentives for innovation. And if unauthorized repairs undermine those rights, consumers will lose out on the next breakthrough product.

But once those arguments are examined closely, it becomes clear that they are usually little more than a smokescreen, obscuring an anticompetitive agenda behind appeals to innovation. Accessing a tractor's embedded software to repair it does not infringe any copyrights. Repairing your vacuum cleaner does not infringe any patents. The importation of authentic parts with microscopic trademarked logos does not confuse consumers. And sharing repair techniques does not expose trade secrets. Admittedly, these activities might reduce device makers' revenue. But frankly, so what? IP rights are not designed to insulate companies from all competitive pressures or guarantee their profitability.

In theory at least, intellectual property law is meant to serve the interests of the public; the financial fortunes of rights holders are a secondary concern. Patents and copyrights are intended to establish legal incentives to create new works and inventions. But if those incentives are too strong, they increase costs for the public without providing any additional social benefit.[1] If a pharmaceutical company would have invested in developing its new drug in exchange for ten years of monopoly pricing, giving it twenty years of exclusivity is a terrible bargain for the public. Trademarks serve a different purpose. They are meant to make it easier for consumers to navigate the marketplace by preventing confusingly similar names and logos. By doing so, the law is supposed to encourage competition, not hinder it. When brands function as reliable indicators of source, it's easier to find the products we want and avoid the ones we don't. Finally, trade secrets serve the dual functions of encouraging firms to develop valuable information while maintaining a boundary between healthy competition and corporate espionage. None of these legal rights are absolute. To reflect that, each of these bodies of law contains internal limitations, designed to cabin their scope and avoid collateral damage to other social values.

This chapter will describe both how device makers try to leverage IP rights to restrict repair and why those assertions are, as a rule, inconsistent with a proper understanding of the law. Regardless of their ultimate merits though, IP claims have a chilling effect on repair. Litigation is uncertain, mounting a defense is expensive, and device makers enjoy massive resource advantages over consumers and repair providers.[2]

Copyrights

Copyright law provides authors exclusive rights over their creative works, allowing them to capture the market value of books, music, film, art, and software. As long as those works are minimally creative and recorded in some tangible form, copyright is automatic. In theory, legal rights against copying encourage

creators to invest more time and effort producing works for the public to enjoy. In reality though, lots of creativity occurs in the absence of copyright incentives.[3] And the evidence suggests copyright exclusivity doesn't consistently lead to more or better creative works.[4] Even if we accept the incentive theory, the law recognizes the need for limitations and exceptions that narrow copyright's scope. A range of copyright doctrines are designed to safeguard the interests of subsequent creators, consumers, and the public more broadly.

Here are a few of the most significant under US law. Because they lack originality, facts – no matter how unexpected – can't be copyrighted.[5] So anyone is free to repeat the cosmically bizarre truth that famed playwright Samuel Beckett used to drive his young neighbor, the future wrestling legend Andre the Giant, to elementary school.[6] In addition, copyright extends only to an author's unique expression of an idea, not the underlying idea itself. That means the producers of *Armageddon*, the 1998 film about a mission to save the earth from an impending asteroid collision, have no claim against the producers of *Deep Impact*, the 1998 film about a mission to save the earth from an impending comet collision. The same is true for *The Prestige* and *The Illusionist* (2006), *Friends with Benefits* and *No Strings Attached* (2011), *Olympus Has Fallen* and *White House Down* (2013), and a parade of other pairings. Copyright also excludes functional elements described or contained in a work. Those include systems, methods, and processes.[7] So while a YouTuber might own their video explaining how to make fluffy rainbow unicorn slime, the copyright in that video does not give them the authority to stop anyone else from making or selling the resulting goop. Finally, when it comes to useful articles, or functional objects, copyright only protects creative elements, like graphics or sculptural components, that are separable from the article as a whole.[8] The Supreme Court, however, recently opened the door for broader protection under that standard.[9]

Beyond these limitations, the fair-use doctrine permits unauthorized uses of protected works when any harm to the copyright holder is outweighed by the social benefit of the use.

Courts have recognized a broad range of fair uses – from parodying popular songs and reproducing works in news reporting, to extracting functional information from video games and digitizing millions of books to create a search engine.[10] Because it presents a fact-intensive question that can only be resolved through litigation, establishing fair use is an expensive and uncertain proposition.

Finally, like other IP regimes, copyright recognizes the principle of exhaustion. Once a copyright holder has sold or otherwise transferred ownership of a particular copy of a work, they lose the right to control how it is distributed. Exhaustion – also known as the first-sale doctrine – is what permits us to lend our books to friends and sell our used records. Without it, copyright holders would retain control of those copies even after we purchase them. Collectively, these doctrines and others define and limit the appropriate scope of copyright.

Part Numbers and Manuals

Given its focus on creative works, you might not expect copyright law to have much to say about repair. But copyright disputes with implications for repair crop up with some frequency. One of the first, decided in 1901, dealt with a reseller of children's books.[11] George Doan bought used books in various states of disrepair. Pages were "soiled and torn," and covers were damaged or missing. Before reselling them, Doan repaired the books – replacing missing pages and in some cases reproducing missing covers "in exact similitude" of the originals. When Doan was sued by the American Book Company for copyright infringement, the Court of Appeals for the Seventh Circuit rejected the claim. As the owner of the books, Doan enjoyed a "right of repair or renewal" that allowed him to replace missing components and fashion new ones, even if they were "exact imitation[s] of the original." As the court put it, the "right of ownership in the book carries with it and includes the right to maintain the book as nearly as possible in its original condition." To deny that right would have been "intolerable and

odious." The right to repair, in other words, is an inherent feature of ownership.

Decades later, manufacturers hit on another strategy for repurposing copyright law to control the repair market, this time by asserting ownership of part numbers. Repairing modern equipment requires access to replacement parts, and identifying the precise part you need can be a challenge. Companies typically assign part numbers to each of the hundreds or thousands of components that make up a complex piece of machinery. For sellers of third-party parts, the best way to communicate that your parts are compatible is to copy or reference the original equipment manufacturer (OEM) part number. Say you need to replace the ice-maker assembly in your freezer. You know the OEM part number is D7824706Q. If you want to find a compatible assembly from a third-party seller, the part number seems like an obvious search term. But for precisely that reason, the manufacturer would prefer to prevent anyone else from using it.

That was the strategy lawn-care equipment maker Toro attempted in the 1980s, as it faced new competition from independent part manufacturers. Toro sued R&R Products, alleging it had unlawfully copied Toro's part numbering system. R&R marketed its products in a mail-order catalog that listed Toro's part name and number alongside R & R's replacement part and price. The court rejected Toro's copyright assertion because its system of arbitrarily assigning a random number to each replacement part failed to satisfy copyright's minimal standard for creativity.[12]

Other companies tried to learn from Toro's mistakes. ATC marketed its parts in a catalog featuring illustrations of disassembled vehicle transmissions. Each image showed the various parts, their physical relationship within the assembly, and their part numbers. When a new competitor, Whatever It Takes, launched a similar catalog with the same part numbers, ATC sued.[13] ATC argued that its numbering system, unlike Toro's, required considerable judgment and creativity. Rather than a random sequence, ATC organized parts into a taxonomy and predicted the development of new parts by leaving some

numbers unassigned. Nonetheless, the court held that the system was unprotectable since ATC's taxonomy left it little discretion as to the number of any individual part. Moreover, the court rejected ATC's claim that Whatever It Takes copied its illustrations. Since those drawings "were intended to be as accurate as possible" they were "the antithesis of originality."

In yet another case, Southco, a manufacturer of fasteners used in computer and telecommunications equipment, sued Kanebridge, the distributor of a rival line of interchangeable parts.[14] Southco's numbering system was the industry standard. So Kanebridge included Southco's part numbers in the comparison charts it used to market its own parts. Unlike Toro and ATC, Southco argued that its part numbers themselves, rather than the system that produced them, were copyrighted. Those numbers were made up of nine digits reflecting various characteristics of each fastener – the material, thread size, length, and finish, among others. But again, once that system was established, the part number was determined by mechanical application of the rules, not creative choice. So, the court rejected Southco's copyright claim.

Contrast that with the names competing paint manufacturers give to nearly indistinguishable shades of white. Sherwin Williams offers Snowbound, Westhighland, and Heron Plume, while Behr has Whisper, Bit of Sugar, and Night Blooming Jasmine. Naming your 5 mm captive screw, say, Startled Predawn Antelope might be more creative, but it doesn't serve the needs of customers nearly as well. And even if Southco had chosen more expressive names for its parts, copyright isn't available for names, titles, and slogans.[15]

In recent years, some manufacturers have taken a new tack. Rather than part numbers, they've claimed copyright in repair manuals. These documents contain useful information for diagnosing and repairing various common failures. They might provide step-by-step instructions for disassembling a device or replacing broken components, saving consumers time, money, and frustration. In many instances, manuals help decipher cryptic error codes. If the LED on your furnace flashes twice,

for instance, that might mean the pressure switch failed to open. Six flashes signal an ignition failure, and ten means the electrical polarity is reversed. Without the right documentation though, those codes are meaningless. Laptops, home appliances, vehicles, and even medical equipment often include repair manuals. But manuals can be lost or destroyed over time. So, access is important, especially for owners of used devices and independent repair shops that service dozens of different models. Although some manufacturers make digital versions easily accessible, or even affix key information directly to the product, other companies insist on limiting access.

In 2012, Toshiba demanded that Australian blogger Tim Hicks remove repair manuals for hundreds of laptop models from his website, Future Proof.[16] Toshiba offered a litany of justifications. It cited alleged safety risks from laptop self-repair, a concern apparently not shared by most other major manufacturers. It claimed the manuals contained unspecified "proprietary information" and that they were "only available to Toshiba authorised service providers." But ultimately, Toshiba's demand hinged on its assertion of copyright in the manuals. By reproducing and displaying them online, the company argued, Hicks was infringing its exclusive rights. Recognizing the costs of taking on a company like Toshiba, Hicks complied.

More recently, the availability of repair manuals has taken on greater significance. In 2020, iFixit announced its Medical Device Repair Database, a collection of repair manuals for more than 13,000 ventilators, anesthesia systems, and respiratory analyzers, among other devices.[17] It wasn't the first collection of medical-device manuals, however. Frank's Hospital Workshop, a site based in Tanzania, has been a go-to resource for medical technicians for years.[18] But the scope of iFixit's effort was remarkable, and its timing – as the coronavirus threatened basic healthcare infrastructure around the globe – reflected the dire need for fast, reliable repairs. While some medical-device makers share their manuals online, many do not. A centralized repository of those documents offered medical professionals a trusted, organized,

and annotated source for information necessary to keep patients alive.

But in May of 2020, Russell Wheatley, the Chief Intellectual Property Counsel for Steris, an Ohio-based manufacturer of medical sterilization equipment, sent a letter to iFixit.[19] The company demanded removal of all its manuals from the iFixit database. It gave only one reason: copyright. To a copyright novice, this may look like an open-and-shut case. Steris claims to own copyrights in its manuals, and iFixit reproduced them without permission. But the analysis isn't quite so straightforward. Indeed, there are good reasons to doubt that a court would side with this effort to restrict access to repair information.

First, looking at the manual for the Steris Harmony surgical-lighting system reveals that much of the information it contains is simply not subject to copyright.[20] About one-third of the manual, roughly fifty pages, is a long list of part names and numbers, accompanied by simple illustrations. As we've seen, courts are hostile to copyright claims rooted in factual, unoriginal lists of parts and their depiction in straightforward drawings. Beyond that, the bulk of the manual is a collection of methods and processes beyond the scope of copyright. The "service mode procedure," for example, is a step-by-step guide for navigating a menu to perform diagnostics and firmware updates. Elsewhere, the manual details the process for replacing or adjusting various components, like this one:

8.4 Knuckle Cover Removal (Any) and Assembly

1. Remove the screw securing the knuckle covers together. Set aside, the screws are not captive.
2. Gently pry the halves of the covers apart using a small flat-blade screwdriver. Inch the screwdriver along the seam gently, until the cover halves separate.
3. Re-install the covers by gently snapping the sections together.
4. The screw must be secured into the knuckle covers with LOCTITE 242 (STERIS part number P129377-290) or equivalent.

Even if we generously assume this mechanical description of an uncopyrightable process is creative, it falls within what's

known as the merger doctrine, a principle that recognizes some ideas can only be expressed in a handful of ways. There may be a nearly infinite variety of ways to express the idea of unrequited love, but there's less room for artistic flourish when describing the removal of a Steris knuckle cover. Aside from minor variations in word choice – perhaps "tenderly separate" instead of "gently pry" – any clear, accurate description of that process is going to look nearly identical to Steris's formulation. Under those circumstances, the idea and its expression are considered merged, and neither is subject to copyright.[21]

But let's assume these manuals contain some scrap of original expression that merits copyright. Even then, iFixit can make a strong case for fair use. Among the key factors courts consider in fair-use cases is "the purpose and character of the use." Here, iFixit's purpose in posting the manuals would strongly favor fair use. First, the Medical Device Repair Database is a noncommercial offering. iFixit doesn't charge for access to the manuals. In fact, it undertook the project, at considerable cost, as a public service. Second, by collecting thousands of medical-device manuals in a single location, organizing them in an intuitive taxonomy, and making them searchable, iFixit has created a new resource that is far more useful than the sum of its parts. In fair-use parlance, this is a transformative use, a fact that bolsters iFixit's case significantly.

In response, Steris would likely point out that in addition to selling hospitals equipment that costs tens of thousands of dollars, it charges as much as $1,100 for manuals.[22] Steris would argue that by posting those manuals for free, iFixit interferes with its ability to sell copies. While iFixit's manual repository might reduce Steris's revenue, that's not necessarily harm that copyright law ought to worry about. If medical technicians are downloading the manuals to access facts, methods, and processes rather than Steris's poetic phrasing, that lost revenue is not attributable to copyright infringement. And even if it were, a court could easily conclude that any financial harm is outweighed by the public benefits of hospital equipment that works reliably in a time of crisis.

No one in their right mind picks up a medical-device repair manual for its literary value. Having perused a few, I can assure you that they aren't exactly beach reads. They are documents with a very specific purpose – to help the reader maintain, diagnose, and repair a piece of equipment. Understood in that light, copyright in the manual becomes a tool to control repair. In other words, if companies like Steris can limit access to the manual, they can limit repair. Servicing these complex devices is nearly impossible without access to detailed technical information. But copyright law was never intended to create repair monopolies.

As strong as iFixit's case is, definitively establishing any of these theories in court is an expensive proposition. Litigating a copyright case of this sort to trial could easily rack up legal fees in excess of $1 million.[23] Luckily, iFixit was represented by the Electronic Frontier Foundation, a nonprofit legal-services organization with deep intellectual property expertise.[24] It pushed back, and the manuals remain available today. But not everyone on the receiving end of a legal threat from a device maker with billions of dollars in annual revenue can be so fortunate.

Software and Circumvention

Software introduces another avenue for manufacturers to enlist copyright law to limit repair. As we've already seen, software code is essential to the functioning, diagnosis, and repair of both modern consumer goods and industrial machinery. And since copyright extends to that code, device makers are irresistibly attracted to the legal power it seems to promise.

One early example of this strategy, dating back to 1992, pitted a computer manufacturer against an independent repair provider. MAI Systems created workstations that ran its own operating system, programs, and diagnostic software. It also offered repair and maintenance services to its customers, mostly small banks and credit unions. When Peak Computing began competing for those same repair contracts, MAI looked for a way to stop them. It sued for copyright infringement,

alleging that when Peak booted up customer's computers and loaded the diagnostic software, it made copies of MAI's code in the random-access memory (RAM) of those devices.[25] And since MAI's license agreement didn't permit copying by third parties like Peak, it argued those copies were infringing. Even though RAM copies are temporary, and the owners of the computers wanted Peak to access them, the court sided with MAI.

While influential, the decision in *MAI v. Peak* was roundly criticized.[26] It established a rule, followed by several later courts, that merely loading a program or data in RAM creates an infringing reproduction. That means every time you open a file or run a program, you need either the permission of the copyright holder or some legal justification. In a world in which embedded software controls our phones, cars, and blenders, that rule gives copyright holders incredible power. This interpretation, however, is inconsistent with the text of the Copyright Act. It makes clear that a copy must be permanent enough to "permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration."[27] Information stored in RAM for a few seconds or minutes almost certainly fails that standard, as the Second Circuit eventually concluded decades later.[28]

Aside from the broader RAM copy problem, Congress understood that the *MAI* decision spelled potential disaster for repair providers. It responded by creating a new exception to copyright infringement that insulates repair and maintenance from liability. Under § 117(c), owners or lessees of machines are permitted to make – or to authorize providers to make – copies of computer programs in the course of maintenance or repair.[29] But that right is limited in important respects. The copies can't be used for any other purposes and must be destroyed after the repair or maintenance is complete. Most crucially, the copies must be "made solely by virtue of the activation of a machine that lawfully contains an authorized copy of the computer program." That means if software necessary for repair isn't already stored on the machine, owners and repair providers are not entitled to obtain or make copies.

Device makers have taken advantage of that limitation by designing external software tools. The proprietary software John Deere uses to authenticate replacement parts, for instance, is not installed on farmers' tractors, but on technicians' laptops.[30] And without that code, farmers and independent repair shops can't initiate authentic replacement parts. Deere expects farmers to pay hundreds of dollars for a technician to bless those components. But in response, some farmers have turned to Ukrainian websites that sell unauthorized copies of John Deere software as a means of bypassing these restrictions.[31] Downloading that software without permission is arguably an act of infringement, even when done for legitimate repair purposes.

On top of that, the software license that accompanies new Deere products insists farmers may not "purchase ... any circumvention or hacking device that is designed to circumvent or hack the [licensed software or product]."[32] By acquiring John Deere software from an unauthorized source, farmers may violate that provision. If so, Deere could argue that farmers infringe copyright by simply using their equipment, since embedded software is reproduced in the tractor's memory. That argument is far from a slam dunk for Deere, however. First, it would depend on a court embracing *MAI*'s flawed RAM copy doctrine. Moreover, courts tend to be reluctant to impose copyright liability for license violations unless they bear some reasonable connection to the underlying copyright interests.[33] Where the alleged infringement consists of farmers firing up their tractors, Deere faces an uphill battle. Finally, the Copyright Act gives owners of copies of software the right to make copies that are essential to their use. But this right extends only to those who own copies. Deere insists that farmers are licensed to use its software, but don't actually own the embedded copies that make their tractor "run like a Deere."[34] General Motors (GM) makes the same claim about the code embedded in its vehicles.[35] In the end, farmers have good arguments against infringement. But they still face risks in going up against a well-funded copyright bully.

Even if we are confident farmers won't be deemed copyright infringers, they aren't necessarily in the clear yet. Copyright law offers device makers another potential tool to stamp out unauthorized repair. Section 1201 of the Digital Millennium Copyright Act (DMCA) makes it unlawful to circumvent technological protection measures that restrict access to copyrighted works, including software.[36] In other words, it's unlawful to remove digital locks meant to keep you away from copyrighted material, including software. It also violates § 1201 to create, sell, or distribute tools that enable circumvention.[37] These are two sources of legal risk above and beyond traditional copyright infringement.

You may be familiar with various species of digital rights management (DRM) technology that limit access to music, movies, and video games. When it was enacted in 1998, § 1201 was intended to encourage copyright holders to make their works available online.[38] The idea was that if they could rely on DRM to restrict access to their works, rights holders would be more likely to embrace digital distribution. But it didn't take long for manufacturers of printers, garage door openers, and other devices to realize that § 1201 offered them the chance to limit competition for aftermarket parts and service. Courts rebuffed those early efforts to expand the DMCA's scope.[39] But the risk of broad applications of § 1201 remains a concern for repair providers and part makers. Today, manufacturers continue to rely on digital locks to restrict access to the embedded code that controls devices from smartphones to cars. Because that code is often necessary for diagnosis and repair, those protection measures pose practical hurdles for consumers and repair providers. Section 1201 compounds those difficulties by introducing legal liability for removing or bypassing the locks on the devices we own.

One court rightly rejected an attempt to use § 1201 to shut down a repair provider.[40] StorageTek sold data-storage systems. Those systems were made up of a number of "silos," each containing a robot arm that inserted tape cartridges into various drives. Each silo was operated by a control unit, and collectively

the system was controlled by a networked management unit. Those units ran StorageTek's software, including diagnostic programs, which it claimed to license to system owners. In an effort to kneecap a competitor, StorageTek sued Custom Hardware Engineering & Consulting (CHE), an independent repair provider, alleging that CHE circumvented StorageTek's protection measures to access to its software code.

StorageTek's software generated error codes, which CHE needed to capture in order to diagnose faulty machines. To access those codes, CHE had to override GetKey, a password-protection scheme StorageTek created to lockdown its systems. At first, CHE used a tool that generated multiple passwords to crack GetKey through brute force. Later, CHE learned how to mimic the signals sent to the control unit to divulge error codes. StorageTek alleged that both techniques circumvented its access controls.

The Federal Circuit was not persuaded. In a prior case, the court held that to violate § 1201, circumvention must have some plausible connection to an act of copyright infringement.[41] Without that "critical nexus," circumvention is lawful. Applying the same logic to StorageTek's claim, the court was satisfied that there was little chance circumvention would lead to infringement since CHE was entitled to make copies of the software under § 117. While that reasoning would seem to protect owners and repair providers from circumvention liability in many circumstances, other courts have declined to adopt the Federal Circuit's nexus requirement, contributing to ongoing legal uncertainty around repair.[42]

When it enacted § 1201, Congress recognized its potential for unintended consequences. So, it called on the Copyright Office and the Librarian of Congress to conduct a rule-making every three years to identify noninfringing uses that are likely to be adversely affected by the anticircumvention provision. Those uses are then protected by temporary exemptions.[43] In 2015, after a hard-fought battle by repair advocates, the Librarian adopted an exemption permitting the circumvention of DRM that restricts access to software that controls "motorized land vehicles" for the purpose of diagnosis and repair.[44] In the next rule-making, that exemption was expanded to include software

that controls a "smartphone or home appliance or home system, such as a refrigerator, thermostat, HVAC or electrical system."[45]

These exemptions were landmark successes for repair advocates, but they are limited in scope. First, they don't include lots of devices, like tablets, smart speakers, cameras, televisions, and game consoles. Second, they are temporary. In 2021, the Copyright Office will conduct another rule-making and may revise, narrow, or eliminate these exemptions altogether.[46] Third, exemptions are limited to § 1201's anticircumvention provision. They offer no defense to the prohibition on trafficking in circumvention tools.[47] So while it is lawful to circumvent in order to repair, creating and sharing tools that enable circumvention are not. This creates significant practical hurdles for independent repair. Even for sophisticated operations, building a circumvention tool from scratch is a major undertaking.

The United States has aggressively exported its anticircumvention regime around the globe, foisting it on other countries as a key provision in bilateral and multilateral trade agreements over the past two decades. To date, the jurisdictions to accede to these demands include: Australia, Bahrain, Canada, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Morocco, Nicaragua, Oman, Panama, Peru, Singapore, and South Korea.[48] Likewise, the European Union adopted an anticircumvention regime in 2001 at the urging of US interests.[49] And today, the United States continues to pressure countries like South Africa to adopt harsh anticircumvention rules.[50] But the eagerness to export § 1201 has not extended to its exceptions and limitations. So, while jurisdictions are generally free to craft defenses or exemptions like those that currently acknowledge repair in the United States, there is no guarantee that they will. As a result, these trade agreements imperil legitimate repair activities around the globe.

Utility Patents

Like copyrights, patents are designed to create economic incentives. In exchange for market exclusivity, inventors devote time

and capital to developing new technologies. The resulting inventions are then shared with the public – embodied in products we buy and published in patent documents. But while copyrights are conferred automatically for even minimally creative works, utility patents are granted only if inventions satisfy higher thresholds.

In the United States, an invention must first fall within the scope of patentable subject matter. Patents extend to machines, articles of manufacture, compositions of matter, and processes. Abstract ideas, laws of nature, and natural phenomena, on the other hand, are excluded.[51] Second, an invention must be novel; only inventions that are new are patentable.[52] Third, it must be non-obvious.[53] In other words, even if the elements that make up an invention have never been combined before, if that combination would have occurred to a person of ordinary skill in the relevant field, it's not patentable. And finally, the invention must have some specific, substantial, and credible use.[54] An elaborate collection of components that serves as a paper weight isn't a patentable invention. Most other jurisdictions apply a similar set of standards. In Europe, for example, inventions must be "new," demonstrate an "inventive step," and be "susceptible of industrial application."[55]

Patents typically last for twenty years.[56] During that period, utility patents confer broad exclusive rights. They grant the patent holder the right to prevent others from making, using, or selling the invention.[57] With few exceptions, unless you have permission from the patent holder, those activities constitute infringement. As a result, patent holders wield considerable power over the manufacture and sale of products embodying their inventions, as well as their use – even for private, non-commercial purposes.

The exhaustion doctrine is one critical limitation on the power of patentees. Like its analog in copyright law, exhaustion prevents patent holders from asserting control over the use and disposition of a particular product after its sale. The owner of a patented device is entitled, as a matter of law, to use it as they see fit, sell it, or otherwise transfer ownership.[58] That's true

even if the patentee objects. In essence, the personal property rights of the owner of the physical product trump the intellectual property rights of the patent holder. As the US Supreme Court recognized as early as 1852, "when the machine passes to the hands of the purchaser, it is no longer within the limits of the monopoly. It passes outside of it, and is no longer under the protection of the act of Congress . . .. The implement or machine becomes [the owner's] private, individual property."[59] Crucially, the purchase of a patented machine "carrie[s] with it the right to the use of that machine so long as it was capable of use."[60]

This centuries-old principle remains vital today. In 2017, the Court reaffirmed a broad patent exhaustion rule when it rejected an effort by the printer manufacturer Lexmark to prevent a competitor from refilling and reselling compatible ink cartridges.[61] Despite Lexmark's restrictive license terms, the Court held the company was powerless to prohibit refurbishing its cartridges as a matter of patent law. In doing so, the Court emphasized the connection between exhaustion and repair:

> Take a shop that restores and sells used cars. The business works because the shop can rest assured that, so long as those bringing in the cars own them, the shop is free to repair and resell those vehicles. That smooth flow of commerce would sputter if companies that make the thousands of parts that go into a vehicle could keep their patent rights after the first sale. Those companies might, for instance, restrict resale rights and sue the shop owner for patent infringement.

Exhaustion guarantees an owner's right to use the products they buy, and courts have consistently recognized an inherent right to repair. But importantly, exhaustion does not extend to making or reproducing a patented device.[62] A hospital that purchases a patented surgical robot, for example, isn't entitled to build a second one.

This distinction between repair and reconstruction stretches back to *Wilson v. Simpson*, an 1850 case about replacing worn

blades on a planing machine.[63] The owners of the machine argued that they were entitled to replace dull blades every few months to keep the device operational. But the patent holders insisted that "when any [part of the machine] is either worn out by use, or otherwise destroyed, then the combination invented – the thing patented – no longer exists, and cannot be restored without the exercise of the right to make." In other words, when the owner replaces a broken or worn component, they are not merely using the invention, they are remaking it. The Court disagreed. Replacing worn or broken parts is an act of "restoration, and not reconstruction." The Court understood repair as "no more than the exercise of that right of care which everyone may use to give duration to that which he owns."

Almost a century later, the Supreme Court revisited the repair of patented devices. This time, the owner of a patent on a convertible car roof, operating under the decidedly uninspired name Convertible Top Replacement Company, sued Aro Manufacturing for selling replacement fabric cut to fit the patented invention.[64] The patent described a device with three basic components: "a flexible top fabric, supporting structures, and a mechanism for sealing the fabric against the side of the automobile body." The patentee maintained that by selling fabric patterned to fit its product, Aro was helping customers remanufacture the patented device. The Court rejected that characterization. As it wrote, the "mere replacement of individual unpatented 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."

Courts have outlined a broad general rule that insulates repair from claims of patent infringement – where repair is understood as the "restoration to a sound, good, or complete state after decay, injury, dilapidation, or partial destruction."[65] Repair is not limited to temporary fixes or the replacement of minor components.[66] The rule embraces one-off repairs and large-scale industrial refurbishing alike.[67] It even applies to modifications of the original design, so long as those changes extend the device's useful life.[68]

Even patented products that were explicitly designed for one-time use can be repaired without the permission of the patent holder. One long-running dispute centered on Fuji's patents on single-use disposable cameras. These cheap plastic devices were sold preloaded with film. After snapping a couple of dozen photos, purchasers would drop them off for processing. They'd receive physical prints after a few days, but never see the camera again. Refurbishers like Jazz Photo collected depleted camera bodies, loaded them with new film, replaced their batteries, reset their counters, and resold them. Fuji sued, alleging the remanufacture of its patented technology.[69] But the court understood that the useful lifespan of the camera was not limited to one roll of film. Even though Fuji marketed them as single-use devices, "the patentee's unilateral intent, without more, does not bar reuse of the patented article, or convert repair into reconstruction."

Admittedly, the line dividing repair from reconstruction isn't always a particularly bright one.[70] But that uncertainty is nothing new. The question has frustrated courts for more than a century. As one court considering the repair of patented sewing machines wrote in 1901, "The difficult question still remains . . . . When does repair destroy the identity of such device or machine and encroach upon invention? At what point does the legitimate repair of such device or machine end, and illegitimate reconstruction begin?"[71] That same year, a British court approached the question by contemplating a hypothetical farm cart:

> A man has at the beginning a new cart. By-and-bye the wheels, one or both of them, have worn out, and he puts on a pair of new wheels. Is it or is it not the old cart? Few people would doubt that it is the old cart . . . . But by-and-bye the shafts fail, and for the old shafts are substituted new ones. I do not wish to express a decided opinion, but it is quite possible you have still the old cart. But if after that you come to the body of the cart, and the body of the cart is either taken away and a new body is put there, or new wood is put for

> a large portion of the cart, surely it is impossible to then say that the old cart still remains.[72]

The sequential replacement of parts hints at a deeper puzzle that dates back at least 2,000 years. Plutarch described how the Athenians preserved the ship that carried Theseus home from Crete. "They took away the old planks as they decayed, putting in new and stronger timber in their places."[73] Among philosophers, the ship of Theseus embodied the problem of identity over time. Was the preserved ship the same vessel Theseus captained, or was it a new ship altogether?

Understandably, courts have struggled to resolve these metaphysical questions. They've considered a litany of factors to distinguish repair from reconstruction over the decades – whether the replaced part had a short useful life compared to the rest of the device, whether the part was broken or merely worn, whether it was expensive or cheap, and whether it was central to the essence of the patented innovation.[74] At other times, courts took into account the intent and expectations of patentees and consumers. In its *Aro* decision, however, the Supreme Court cautioned against reliance on these various factors. The central question according to the Court is whether the device "viewed as a whole, has become spent." By "spent," the Court seems to mean that the entire device has reached the end of its useful life. If the device is deemed spent, then efforts to restore its functionality amount to unlawful reconstruction.[75] If the device as a whole isn't spent – even if some of its parts are – those components can be replaced or renewed through lawful repair. But how exactly do courts decide whether a device is spent? Lower courts have often reverted to the same multifactor analysis that characterized the pre-*Aro* decisions. So, while patent law generally accommodates a broad notion of repair, this uncertainty about the standard lower courts will apply casts the shadow of potential liability over consumers and repair providers.

The framework adopted by US patent law is largely consistent with the approach embraced by courts in other jurisdictions. In Australia, Germany, Japan, and the United Kingdom, liability

also turns on the fundamental, if elusive, distinction between repair and reconstruction. As the Supreme Court of Japan phrased it, the question is whether the defendant "has created a new product which has a different identity from the original product."[76] But like their US counterparts, these courts have at times struggled to settle on consistent, predictable standards. Japanese courts consider a range of factors, including the attributes of the patented product, the nature of the underlying invention, and the specific acts of replacement or refurbishment undertaken by the defendant.[77] In Germany, courts ask whether the defendant's actions would be understood as typical maintenance activity in the relevant market and whether the technical essence of the invention is reflected in the replaced components.[78]

Likewise, UK courts have long recognized "that a purchaser of a patented article may carry out repairs to it without being held liable for infringement. On the other hand, he cannot manufacture a new article . . . and claim that he has not infringed merely because . . . he has used parts derived from a patented article sold by the patentee."[79] In 2013, the Supreme Court of the United Kingdom rejected a patent holder's contention that replacing one element of its patented device amounted to reconstruction.[80] In *Schütz v. Werit*, the patentee sold containers used to transport hazardous liquids. They consisted of a plastic bottle mounted within a metal cage, which in turn rested on a pallet. The cage and pallet could be used multiple times, but the bottles were designed for a single use. Werit provided replacement bottles, which Schütz alleged infringed its patent. The Court recognized the replacement of the bottles as a lawful repair rather than the making of a new device. That holding turned on two key facts. First, the useful life of the bottle was considerably shorter than the rest of the apparatus. On average, the bottle could be swapped out five or six times before the cage needed to be replaced. Second, the bottle did not reflect the "inventive concept" of the patent. In other words, the bottle is not what set the container apart from the existing technology at the time it was invented.

In 2020, the High Court of Australia confronted the question of repair in a case that closely mirrored the facts of the US *Lexmark* decision.[81] Epson sold printers and single-use ink cartridges. Calidad imported and sold refilled Epson cartridges with memory chips modified so that printers would recognize them. Epson alleged the refurbished cartridges infringed its patents. The question before the High Court was "whether modifications made to a product to enable its re-use amount to a making of a new product." Those modifications – puncturing the cartridge to refill the ink, sealing the resulting hole, and updating the memory chip – did not "amount to an impermissible making of a new product." Rather, they were "within the scope of the rights of an owner to prolong the life of a product and make it more useful."

Importantly, the High Court rejected the contention that the legality of repair turned on an implied license. Under that approach, the sale of a patented device is presumed to entail the right to repair, on the assumption that both the buyer and the seller expect repairs to occur and have bargained accordingly. But under that rationale, a seller could expressly withhold or limit the availability of repair. So, if a prominent notice forbidding repair accompanied your new car, fixing a faulty transmission might count as infringement. Instead, the Australian High Court, like its counterparts in Germany, Japan, the US, and the UK, rooted the right to repair firmly in the exhaustion principle. After the initial sale, the patentee loses all rights to control the product's use, regardless of any limits or reservations communicated by the patent holder.

Canada is one notable exception to this trend. As in other jurisdictions, Canadian law acknowledges that "the purchaser of a patented article may repair the components without infringing the patent."[82] And Canadian courts agree that the central question is whether the defendant has made a new article or simply repaired an existing one.[83] But Canadian law has never fully adopted a freestanding exhaustion doctrine. Instead, the rationale for the legality of repair is "the fact that the patent holder is presumed to permit this type of activity."[84]

In other words, patent holders offer purchasers an implied license to repair, a license they could easily withhold. For example, in *Eli Lilly v. Novopharm*, the Supreme Court of Canada declared that once a patented article is sold, the patent owner "no longer has any right with respect to the article" because the patentee "has impliedly renounced his exclusive right of use and sale."[85] If patent holders "express conditions to the contrary," the owner of a patented article would no longer be able to repair it. In *Monsanto v. Schmeiser*, the Court was even more explicit when it wrote, "Ownership is no defence to a breach of the Patent Act."[86] Perhaps because of its rather equivocal foundation, the right to repair under Canadian patent law tends to be less expansive in practice than in other jurisdictions.[87]

Even where courts embrace the right of owners to replace or repair components, patent law can still impede repair. If the components themselves are patented, their production, sale, and use are still subject to the exclusive rights of patent holders. They can use that power to starve repair providers of the replacement parts they need or charge exorbitant prices that discourage third-party repairs.

When Italian volunteers 3D-printed replacement ventilator valves, initial reports suggested they were threatened with a patent infringement suit. The device maker, however, quickly released a statement disclaiming any impending litigation.[88] But nothing in patent law would prevent a more mercenary device maker from pursuing such a claim. Assuming the valve was the subject of a valid utility patent, making replacements – whether through 3D-printing or more conventional methods – would constitute infringement.[89] Luckily, most replacement parts, standing alone, fail to meet the relatively demanding statutory requirements for utility patents. But unfortunately, not all patents are so hard to come by.

Designs

Intellectual property regimes also provide exclusive rights in designs – the appearance or ornamentation of products. In the

United States, design patents are available. In Europe and elsewhere, registered and unregistered design rights serve a similar function. The substantive and procedural details differ somewhat, but these regimes raise tricky questions about the degree to which designs extend to the functional aspects of products and their components. In particular, exclusive rights in the design of replacement parts run the risk of hampering otherwise lawful repairs. Jurisdictions have responded differently to this problem. The United States legal system has shrugged its metaphorical shoulders in indifference. Europe has grappled with the issue more seriously, if not entirely effectively, by limiting the availability and scope of design rights that would undermine repair.

Design Patents

Since 1842, US law has permitted patents on designs.[90] Unlike utility patents, which turn on the functionality of an invention, design patents are meant to grant rights in the aesthetic contributions of a designer. Today, they extend to "any new, original, and ornamental design for an article of manufacture."[91] Patentable designs must be novel, nonobvious, and ornamental.[92] They include the surface ornamentation of an article, including colors and graphic elements, its three-dimensional configuration or shape, or any combination of the above.[93] Iconic designs from Coca-Cola bottles and Eames chairs to Lego figures and Fender Telecasters have been patented, along with hundreds of thousands of less memorable examples.

Once granted, design patents last for fifteen years. During that period, the patent holder has the legal right to prevent others from making, using, selling, offering to sell, or importing the patented design.[94] To prove infringement, the patentee must show that "an ordinary observer, taking into account the prior art, would believe the [defendant's] design to be the same as the patented design."[95] In other words, anyone who makes, sells, or even uses a product that looks too much like a patented design without permission is an infringer.

Over time, shifts in judicial interpretation have eroded safeguards that limited the availability and reach of design patents. That liberalization led to a massive increase in the number of patented designs. In 1980, the United States Patent and Trademark Office (USPTO) granted barely 3,000 design patents.[96] In 2019, it handed out nearly 35,000, more than a tenfold increase.[97] And a 2010 study revealed that the Patent Office rejected less than 2 percent of design-patent applications on substantive grounds.[98] Meanwhile, damages in design-patent cases have reached new highs. After Apple sued Samsung for infringing its iPhone design patents – including its rounded corners, home button, and grid of app icons – a jury awarded more $500 million in damages.[99]

These developments have broad implications across a range of industries. But they have particularly dire consequences for repair. If design patents on components and replacement parts are easy to secure, manufacturers have the power to deny those parts to owners and repair providers, to charge unreasonably high prices, or to condition access to parts on other onerous terms.

We've already seen these strategies play out in the auto industry. A recent case decided by the Federal Circuit – the appellate court with exclusive jurisdiction over patent disputes – illustrates the worry. The Automotive Body Parts Association (ABPA) sued to invalidate two Ford design patents on a truck hood and head lamp.[100] ABPA argued that since consumers prefer parts that not only serve the same function as the original, but also restore their vehicles' appearance, those designs should be deemed functional rather than ornamental. The Federal Circuit disagreed, holding that "the aesthetic appeal of a design to consumers is inadequate to render that design functional."[101] The court also rejected ABPA's exhaustion and repair arguments. Although the sale of a vehicle exhausts Ford's control over the physical components that make it up, it does not give the owner the right to use unauthorized parts that copy a patented design. And since Ford's design patents covered individual parts rather than the vehicle as a whole, patent law's right of repair didn't permit making or using unauthorized parts.

The aftermarket for vehicle parts and accessories is massive, amounting to hundreds of billions of dollars each year in the United States alone.[102] Historically, that market has been competitive, allowing owners to choose between original manufacturer parts or a variety of less expensive non-OEM options, saving roughly $1.5 billion a year when it comes to collision repairs.[103] But design patents threaten to undermine that competitive landscape, forcing consumers and repair shops to purchase original parts at inflated prices.

Since 2005, we've seen an uptick in efforts by manufacturers to crack down on competitive repair parts. That trend began when Ford filed a complaint with the International Trade Commission that stopped imports of replacement parts for its F-150 pickup trucks. The company then struck a deal giving its one-time competitor the exclusive right to distribute aftermarket Ford parts, severely hampering competition.[104] In the wake of Ford's strategy, other carmakers have used design patents on bumpers, fenders, headlights, and other parts to threaten manufacturers, importers, and distributors of non-OEM parts, and the repair shops that use them.[105] This same strategy could just as easily be exploited by the makers of smartphones, cameras, and home appliances.

So how did US design-patent law find itself in this unfortunate situation? Two overlapping sets of changes in the law are to blame. First, courts have expanded the subject matter of patentable designs far beyond what Congress intended. Second, the USPTO, following the clear directives of the Federal Circuit, has all but eliminated any meaningful barrier to obtaining a design patent.

Under the terms of the Patent Act, patents are available for the "design for an article of manufacture."[106] The interpretation of that phrase is central to understanding the proper scope of design-patent subject matter. By interpreting it broadly, courts have opened the door to design patents on products, like complex machines, that were never intended. What's more, courts have paved the way for design patents that claim only parts and – worse still – fragments of parts of those assemblages.

When the US Supreme Court heard an appeal in Apple's lawsuit against Samsung, it defined "article of manufacture" broadly. According to the Court, that term "encompasses both a product sold to a consumer and a component of that product" because it means "simply a thing made by hand or machine."[107] But that reading misunderstands the plain meaning and long history of the term. As Sarah Burstein, one of the leading scholars of the US design-patent regime, has argued, the phrase "article of manufacture" refers "to a tangible item made by humans – other than a machine or composition of matter – that had a unitary structure and was complete in itself for use or for sale."[108]

As an initial matter, "machines" were long understood as outside the scope of design-patentable subject matter. Unlike utility patents, which extend to any "process, machine, manufacture, or composition of matter," design patents are available only for "articles of manufacture."[109] "Machines" are conspicuously excluded. For decades, the Patent Office understood that machines were not considered articles of manufacture and were ineligible for design patents.[110] The first patent claiming the design of a machine wasn't granted until 1930. Foreshadowing future developments, it claimed a truck body and frame.[111] In the decades since, the Patent Office has routinely granted, and the courts unhesitatingly enforced, design patents on machines.

Even if we set aside this nearly century-old error, design-patent law took another, more recent wrong turn. Longstanding principles of design-patent law focused attention on the design as a whole, not its constituent parts. Consumers don't perceive a design as a collection of lines, shapes, and colors, but as an integrated, unitary whole. As one court put it in 1900, "The essence of a design resides, not in the elements individually, nor in their method of arrangement, but in the tout ensemble – in that indefinable whole that awakens some sensation in the observer's mind."[112] Understandably then, design-patent applicants claiming some fragment of an article were typically met with hostility. An application claiming the design of the "forward corner of an automobile body," for example, was rejected

because it did not "cover a complete article of manufacture."[113] On appeal, the rejection was affirmed because the corner of the body was never manufactured and sold separately.

That's not to say that piecemeal design patents were never granted, but it wasn't until 1980 that courts explicitly embraced claims identifying a mere fragment of an article of manufacture. In *Zahn*, the US Court of Customs and Patent Appeals (CCPA) – the predecessor of today's Federal Circuit – considered an application for an "ornamental design for a Shank of a Drill Bit."[114] The claimed design was limited to the upper portion of the bit and explicitly disclaimed the cutting edge – the part that bores the hole. That choice had two important implications. First, the claim extended only to a fragment of the overall article, flouting the principle of integrated, holistic design patenting. Second, since the twist cutting edge pictured in the patent was not part of the claim, it covered any drill bit with a similar shank. So, a spade, core, or step bit would infringe even though the overall appearance of the article would be quite different.

In keeping with its accepted practice, the USPTO rejected the application. But on appeal, the CCPA disagreed. According to the court, the fact that the application claimed only a portion of the drill bit was no barrier to patentability. Specifically, the court held that "a design for an article of manufacture may be embodied in less than all of an article of manufacture."[115] But in characterizing the issue in those terms, the court assumed that Zahn's partial claim constituted "a design for an article of manufacture" in the first place.[116] This begs the question. The issue the court needed to decide was whether a claim directed to a fragment of an article of manufacture is a patentable design at all. As Professor Burstein has persuasively argued, *Zahn* relies on a misreading of the Patent Act and faulty logic.[117] Sometimes courts get it wrong. When they do, we shouldn't be bound by their mistakes forever.

The risks of defining "articles of manufacture" broadly could be tempered if patent examiners assiduously scrutinized the substantive requirements for design patents. Unfortunately,

that's the opposite of what's happened. The Federal Circuit, exercising its exclusive power to review the decisions of the PTO, has consistently lowered the bar for obtaining a design patent. Today, practically anyone with a spare $5,000 and a modicum of patience can get their very own design patent, and with it, the right to credibly threaten competitors with infringement liability.[118]

To qualify for a patent, a design must be novel, nonobvious, and ornamental. But under the prevailing Federal Circuit interpretations, those requirements rarely present meaningful hurdles.[119] To meet the novelty standard, an applicant only needs to show that its design is not "identical in all material respects" to any previously disclosed design – the "prior art," in patent law parlance.[120] In practice, the Federal Circuit is quick to identify minor differences between claimed designs and the prior art, highlighting minor discrepancies that would likely escape the attention of reasonably perceptive consumers, ensuring that the vast majority of designs will be treated as novel.[121]

In theory, nonobviousness is a higher barrier. Even if the precise design has never been seen before, it qualifies for a patent only if it would not have been obvious to a designer of ordinary skill in the relevant field.[122] How exactly do you determine whether a design is obvious? The Federal Circuit applies a two-part test. First, it looks for a primary reference in the prior art – an existing design that is "basically the same as the claimed design." Assuming it finds one, the court moves on to step two, where it searches for secondary reference designs that contain other elements of the claimed design. If the combination of the primary and secondary references would be obvious to a designer of ordinary skill, the claimed design is obvious. Much like its approach to novelty, however, the Federal Circuit is keenly attuned to subtle differences between the claimed design and any would-be primary reference. And without a primary reference, a claimed design can't be deemed obvious.[123]

Finally, patented designs are supposed to be ornamental. Utilitarian innovations – that is to say, inventions that offer

some new functional advantage – are meant to be protected, if at all, with utility patents. Ideally then, the ornamentality requirement would guard against designs that contribute to a device's operation.[124] But again, the Federal Circuit has undermined this core requirement. Unless a design is "dictated by function," it is considered ornamental.[125] That means as long as some alternative design offers "the same or similar functional capabilities," a design will be treated as ornamental.[126]

This anemic standard opens the door for patents on designs that are in no discernible sense ornamental, like standard door hinges and flexible exhaust pipes.[127] Even worse, it permits design patents that offer substantial functional advantages.[128] Apple successfully asserted a design patent on the rounded corners of the iPhone despite the Federal Circuit's acknowledgement that they improved the device's "pocketability" and "durability."[129] And in an earlier case, the court upheld a design patent on the shape of a multifunction demolition tool – a combination hammer and pry bar – as ornamental, despite the fact that its size and shape were inseparable from its function.[130]

Even internal components can be ornamental. According to the court, a design is ornamental even if it is typically hidden from view during normal use. It just needs to be seen at some point between its manufacture and ultimate destruction.[131] In one illustrative case, the Federal Circuit insisted that the design of an artificial hip, despite being hidden once implanted, could be considered ornamental since it was advertised to doctors.[132]

Taken together, the expansion of design-patent subject matter and the erosion of its substantive requirements allow for the proliferation of exclusive rights in the components that make up our devices. Those rights, and the threat of litigation they enable, put third-party repair markets at risk. If the parts you need to repair your car, laptop, or dishwasher are patented, they are likely to cost more, if they are available at all. Authorized repair partners are likely to have more reliable access to those parts, putting additional pressure on independent providers to agree to unfavorable terms to secure the blessing of the

manufacturer. On the bright side, each of these flawed interpretations are a matter of judge-made law. Even without intervening legislation, the courts, if presented with the right facts and persuasive arguments, can correct course. Here's hoping they do.

Design Rights

Compared to the United States, Europe has paid far greater attention to the problems exclusive rights over designs pose for repair. Those problems remain unresolved, but the environment is significantly more hospitable for those who make, sell, and use repair parts.

Under European law, the Design Directive and subsequent Regulation outline the treatment of designs. Eligible designs cover "the appearance of the whole or a part of a product resulting from ... lines, contours, colours, shape, texture and/or materials."[133] To qualify, a design must be "new" and demonstrate an "individual character." Such a design may apply to an entire product or a component, assuming that the component remains visible during normal use, a somewhat stricter standard than courts have applied in the United States.

The newness and individual character requirements are rough analogs to novelty and nonobviousness under US law. The standard for individual character, however, imposes a slightly more rigorous test. To satisfy it, "the overall impression" a design produces on an informed user must differ from that produced by any previous design. That rule potentially filters out some designs that would clear the relatively lax standard for obviousness under US law. Owners of qualifying designs have the exclusive rights to make, offer, put on the market, import, export, or use covered products. For registered designs, those rights last for up to twenty-five years, in renewable five-year periods. Unregistered designs are limited to three years of exclusivity from their first public availability.

Several limitations on design rights touch on the question of repair. Like other IP regimes, design rights are subject to the

general principle of exhaustion. Once a product has been sold or otherwise "put on the market," the rights holder loses the power to control the use or disposition of that particular product. So even if repair counts as a use of the design, an owner would generally be entitled to restore the appearance of a product. Assume your car door is dented in a minor collision. Short of a trip to the body shop, any number of home fixes might solve your problem – a plunger, boiling water, or dry ice and compressed air. None of these techniques would infringe the design under the exhaustion rule. In addition, design rights do not extend to any private or noncommercial acts. So even if you fashioned an identical replacement door yourself, you'd be in the clear.[134]

More broadly, EU law limits the availability of design rights to product features related to repair in two crucial respects. First, no design rights extend to features "solely dictated by [a product's] technical function."[135] This provision generally parallels the ornamentality rule under US law. But it offers a somewhat more effective screen to exclude functional aspects of a design. Initially courts applied the "multiplicity-of-forms" test to determine whether features were dictated by function, denying design rights only when no alternative designs could achieve the same function.[136] But in 2017, the European Court of Justice rejected that rule.[137] It held that the key question is not the availability of alternatives, but whether or not functional considerations, as opposed to visual appeal, were the only factors that determined its appearance.[138] If the designer's choices were all driven by function, design rights are barred. Like the ornamentality rule, this bar undoubtedly fails to screen out some functional product features, but by shifting focus away from available alternatives, it imposes a modestly more rigorous standard.

Second, European design law prohibits rights for product features that "must necessarily be reproduced in their exact form and dimensions in order to permit the product . . . to be mechanically connected to or placed in, around or against another product."[139] This limitation for "must-fit" parts offers

narrow but important operating space for repair. It prevents exclusive rights over aspects of parts or products that are essential to their function. A manufacturer of a rechargeable smart speaker, for example, couldn't claim exclusive rights over the business end of a charging cable, since its precise size and shape are essential to its connectivity.

But not all spare parts are of the "must-fit" variety. Let's say a knob breaks on your kitchen range. Several replacements might fit and do a perfectly adequate job of controlling the burner, but only one design will match the remaining knobs. Understandably, consumers strongly prefer matching hardware. For many, that preference is so strong that they wouldn't even consider a non-matching option an acceptable substitute.[140] That holds true across a range of parts and products.

So how should the law handle design rights for these "must-match" parts? In the run-up to the Design Directive, one proposal would have limited design rights for repair parts to three years.[141] A second proposal would have allowed the use of such designs so long as payment was made to the rights holder. But the question of repair parts proved contentious, and neither proposal was adopted. Instead, Article 14 of the Directive – often referred to as the "freeze-plus" clause – offers a temporary and incomplete solution. It requires member states to keep their existing national rules about repair parts in place, freezing them as is. States are free to change those rules only if their new law would "liberalise the market for such parts" by denying exclusive rights, providing an exception to liability, or otherwise making it easier to make, sell, and use replacement parts.[142] This has led to inconsistent national treatment of repair parts. In some jurisdictions – Belgium, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Poland, and Spain – repair clauses limit rights covering spare parts. In others – Denmark and Sweden – repair parts enjoy a shorter term of exclusivity. The remaining member states haven't adopted any specific rules around repair parts, treating them the same as any other product component.

Community design rights, which are enforceable throughout Europe, demanded a more unified approach. Under Article 110 of

the Regulation, manufacturers cannot enforce their design rights against anyone who repairs a "complex product" to restore its appearance.[143] The precise scope of this limitation has been debated. Elsewhere, the Regulation can be read to limit design rights only if the appearance of the design is "dependent" on the component part.[144] A few courts interpreted Article 110 narrowly, allowing design rights for alloy wheels for cars, for instance.[145] But the Court of Justice rejected that reading. It concluded that design rights couldn't be asserted against parts used in repair regardless of whether the product's overall appearance depended on those components.[146]

Other jurisdictions have wrestled with the best way to accommodate repair parts. Australia's Designs Act, for example, provides a defense to design infringement for repair. It permits a person to use a product embodying a design in order to repair a complex product – one with at least two replaceable components – and restore its appearance. The statute defines repair to include: "restoring a decayed or damaged component," "replacing a decayed or damaged component," "replacing incidental items," and "carrying out maintenance."[147] Once this defense is invoked, the onus is on the design owner to prove that the defendant knew or should have known that the parts were being used for purposes other than repair.[148]

In the United Kingdom, exclusive rights are available for both registered and unregistered designs. But under the Registered Design Act, must-fit features are excluded,[149] and the use of must-match parts to restore the original appearance of complex products is not considered infringing.[150] When it comes to unregistered designs, the Copyright, Designs and Patents Act likewise excludes must-fit features.[151] In addition, competitors are free to copy any features that depend on the appearance of some other article of which they "form an integral part." UK courts, however, have interpreted that provision narrowly. In the leading case, vacuum-cleaner manufacturer Dyson sued Qualtex, a maker of spare parts. Qualtex argued that the designs could be freely copied since they fell within the must-match provision. The court disagreed. It concluded that design rights

should be denied only if the appearance of the product as a whole would be "radically different" if the part were changed.[152] In settling on this standard, the court substantially narrowed the scope of the must-match provision and introduced ambiguity about precisely what it would mean to radically alter the appearance of a product.

Exclusive rights in designs can interfere with repair and limit the exhaustion principle. Even where those problems are recognized, it has proven difficult to overcome the concentrated financial interests of carmakers and other manufacturers. But the models adopted in Australia, Europe, and the United Kingdom are leaps and bounds ahead of the United States, where unchecked design patents pose perhaps the most significant legal threat to thriving repair markets.

Trademarks

Trademarks offer device makers yet another set of legal tools to stymie repair. But luckily, trademark law has developed several doctrines that, if faithfully applied, limit manufacturers' power to leverage their marks against replacement-part makers, repair providers, and consumers. Nonetheless, that hasn't stopped companies from trying to increase the costs and risks of unauthorized repair through trademark claims. And sometimes they succeed, either in court or by intimidating small businesses with threats of expensive litigation.

Unlike copyright and patent, trademark law is not designed to provide economic incentives for creative or innovative products. Instead, it serves two other purposes – promoting fair competition and protecting consumers from unscrupulous sellers. It achieves these twin goals by making it easy for sellers to reliably identify their products and services, and for consumers to confidently find them in the marketplace. Trademarks are source indicators. A brand name, a logo, or sometimes even a unique product design can communicate to prospective buyers the source of a particular product or service.

Let's say you're in the market for a new dishwasher. You've had positive experiences with other Bosch appliances, so you are on the hunt for a matching Bosch dishwasher. When you search online or at your local retailer, Bosch products are easy to find. They bear the company name alongside its magneto armature logo, which it's been using, with minor variations, for over a century.[153] Those trademarks tell you the same firm that designed and built your range and refrigerator stands behind the dishwasher as well. Trademark law reinforces that expectation by forbidding competitors from using names, logos, or other marks that are similar enough to confuse consumers. So, a company called Basch that sells appliances would likely find itself on the receiving end of a successful complaint.

By helping to ensure that these source indicators continue to function reliably, trademark law allows firms to profit from their hard-earned reputations. Bosch spends considerable capital and effort developing high-quality products, advertising them, and building relationships with customers. So, the company has a strong interest in both maintaining its reputation and stopping competitors from drawing in customers with an identical or confusingly similar name. At the same time, consumers want to be sure that if they pick up a dishwasher bearing the Bosch name from their local appliance shop, it was actually made by the company, not some fly-by-night operation. Trademarks give consumers greater confidence in the consistency and quality of the products they buy. They also save us the time and hassle of investigating every product. Trademarks efficiently convey lots of information that we'd otherwise have to gather on our own.

Distinctiveness

Although trademark law serves important goals, overprotection has downsides. Unlike patents and copyrights, which eventually expire, trademarks can last forever. And granting broad rights in marks risks foreclosing competition without offering any benefit to consumers. Imagine that a company manages to

obtain a trademark on a generic term like "repair" in connection with electronics repair services. If the trademark owner could control the use of that everyday term, competitors in the repair market would be at a significant disadvantage. It would make it harder for them to accurately identify their services, forcing them to use business names that use other, less obvious terminology – Alice's House of Fixes rather than Alice's House of Repairs, for example. And that might mean consumers are less likely to discover them.

For good reason, trademark rights aren't available for generic terms.[154] No one can trademark "repair" for repair services or "dishwasher" for kitchen appliances. Terms that describe categories of goods or services are free for anyone to use. In fact, if a mark becomes generic over time, even if it was once associated with a single maker, it loses its trademark status. Aspirin, escalator, and linoleum all met that fate in the United States.[155]

For the law to recognize a word or other symbol as a trademark, it must be distinctive.[156] That is, the mark has to communicate something to consumers about the source of the product. US law considers some marks inherently distinctive. They don't require any additional proof that consumers treat them as source indicators. These include arbitrary, fanciful, and suggestive marks. An arbitrary mark is an existing word with an everyday meaning that has no relationship to the product bearing it. For an electronics company, "Apple" is an arbitrary mark. Fanciful marks are invented words. They have no meaning beyond their association with a source of goods or services. "Hulu" as used by the video streaming service is a good example. In English, the term has no other meaning.[157] So when consumers first encounter it, they are likely to recognize it as a particular service from a single source. Suggestive marks hint at the characteristics of a product or service, but don't describe them directly. Netflix, for instance, suggests something about the internet and movies, but it doesn't tell consumers precisely what sort of service it is.

If a mark literally describes the characteristics of a product or service, firms have to prove that when consumers see or hear

the mark, they associate it with a particular source.[158] This higher burden guards against trademarks that might put competitors at a disadvantage. Airlines seem to love descriptive names. American Airlines, British Airways, Emirates, and Turkish Airlines, to name just a few, are all descriptive. After decades of transporting passengers, mostly on time, and massive advertising budgets, American Airlines has trained us to associate its mark with a specific company rather than the broader category of airlines that are based in America.

The shape or design of a product – referred to as trade dress – is another example of a type of mark that always requires proof of acquired distinctiveness.[159] Under the right circumstances, product design tells us something about source, regardless of any logos, names, or other marks. Guitar enthusiasts can tell the difference between a Gibson Les Paul and a Fender Telecaster from across a crowded arena before hearing a single chord. And the fashion conscious would never mistake a pair of Louboutins for Manolos. But under US law, trademark rights for product design are only available if the owner can prove that consumers associate the shape with a single source of goods. That's a significant burden, and one most products can't satisfy.

European trademark law handles product designs somewhat differently. Rather than a categorical rule that insists on proof of acquired distinctiveness, under EU law the "shape of goods" can be inherently distinctive, eliminating any need for evidence about the actual associations consumers form between the design of a product and its source.[160] Nonetheless, the law recognizes that, on the whole, consumers are less likely to treat the shape of a product as a source indicator. As the European Court of Justice has explained, "only a mark that departs significantly from the norm or customs" for similar goods can be distinctive.[161]

Functionality

Even if a product design clears the distinctiveness hurdle, it still has to contend with trademark law's functionality doctrine.

That rule excludes product features that offer a utilitarian advantage.[162] If the feature makes the product work better or reduces production costs, it cannot be protected as trade dress. That's true regardless of whether alternative designs are available to competitors. In this sense, the functionality bar is a more meaningful limit on trademark rights under US law than the comparatively anemic ornamentality requirement is for design patents. Likewise, EU law prohibits the registration of marks that consist of a shape that "results from the nature of the goods themselves," "is necessary to obtain a technical result," or "gives substantial value to the goods."[163]

Nonetheless, manufacturers have succeeded in claiming product components as trade dress. Carmakers like Ford and Volvo have registered trademarks for grilles, taillights, and other vehicle components.[164] General Motors even successfully sued a toy maker that sold miniature replicas of the Hummer – a vehicle designed for suburban military cosplay.[165] GM alleged that the toys copied "the exterior appearance and styling of the vehicle" including its "grille, slanted and raised hood, split windshield, rectangular doors, [and] squared edges." Based on extensive surveys conducted by GM, the court concluded consumers associated these styling cues with the Hummer brand. It also rejected the toy maker's contention that these design elements were dictated by functional concerns. Without much analysis, the court concluded that the external features of the vehicle were "inherently non-functional" and "likely an unrelated afterthought." There's no reason to think the court's logic couldn't be extended to suppliers of independent repair parts or repair shops. If that happened, consumers and repair providers would be forced to choose between expensive OEM-authorized parts or cheaper nonmatching parts, putting manufacturers and their network of dealers at a distinct competitive advantage.

Other courts, though, have been more sensitive to concerns over functionality. When Chrysler sued a manufacturer of aftermarket Jeep grilles for trade-dress infringement, it contended that the design wasn't functional since there were available

alternatives.[166] The court disagreed. Instead, it saw the central question as what "consumers of grille covers for Jeeps expect," allowing for the possibility that matching the vehicle's aesthetic is itself one important function of the grille.

More recently, in *Apple v. Samsung*, the Federal Circuit rejected Apple's trade-dress claims.[167] The company claimed various iPhone features served as source indicators. These included: "a rectangular product with four evenly rounded corners; a flat, clear surface covering the front of the product; a display screen under the clear surface; substantial black borders above and below the display screen and narrower black borders on either side of the screen; and . . . a matrix of colorful square icons with evenly rounded corners within the display screen." The court saw these elements for what they were – functional features central to the use of the iPhone. As it pointed out, Apple had to "demonstrate that the product feature serves no purpose other than identification." Quite the contrary, each of those features contributed to the overall ease of use of the iPhone. So even if consumers associated them with Apple, it couldn't prevent others from using them.

Taken together, the distinctiveness requirement and the functionality bar tend to filter out most potential trademark claims stemming from the design of a product or its components. Those doctrines aren't foolproof, but they significantly reduce the legal risks facing the repair community. But even putting trade-dress claims aside, there are other ways trademarks can interfere with repair.

Referential Use

If trademark owners have the exclusive rights over their marks, how can repair providers or replacement-part makers effectively advertise?[168] If you repair iPhones, but can't use Apple's trademarks, describing your services quickly devolves into a sort of linguistic charade. Rather than an ad that says, "We repair Apple iPhones," you'd have to try something like, "We repair the popular line of smartphones made by the company

based in Cupertino." But trademark law recognizes the need to refer to trademarked products and has developed tools for just that purpose.

As early as the 1960s, courts were rebuffing trademark owners' efforts to control the use of their marks by repair providers. One important early case centered on an auto-repair shop in Long Beach, California.[169] When Douglas Church opened Modern Volkswagen Porsche Service in 1958, he specialized in – you guessed it – Volkswagens and Porsches. After Volkswagen objected to the name, Church changed it to Modern Specialist. Nonetheless, Volkswagen sued him for trademark infringement four years later. The carmaker alleged that a sign in front of Church's shop that read "Modern Volkswagen Porsche Service" violated its trademarks. Shamelessly, it also argued that the use of the terms "Independent Volkswagen Service" and "Independent VW Service" on business cards, promotional items, and advertisements infringed its marks. But the court was not sympathetic to these overreaching claims. The use of the term "independent," it found, was enough to distinguish Church's services from those offered or authorized by Volkswagen. Moreover, since Church didn't borrow logos, typefaces, or color schemes from Volkswagen, consumers were unlikely to be confused about the source of their repairs.[170]

The terminology didn't exist at the time, but today courts would consider Church's ads and signs nominative fair uses. In 1992, the Ninth Circuit formalized its existing case law favoring these sorts of uses under that banner. The dispute arose when the wildly successful boy band New Kids on the Block sued *USA Today*, a national newspaper, for running a poll that asked readers to weigh in on the eternal question, "Who's your favorite New Kid?" Specifically, a banner on the front page said, "New Kids on the Block are pop's hottest group. Which of the five is your fave?" and prompted readers to vote by phone. When the band sued for unauthorized use of its trademark, the court offered a clear rule permitting references to trademarked goods and services that create no reasonable risk of confusion.

It outlined a three-part test for what it called nominative fair uses. First, if the product or service can't be readily identified without using the mark, it should be allowed. *USA Today* could have asked, "Who's your favorite member of the Boston-based boy band managed by Maurice Starr?" But some readers may have confused the New Kids with Starr's other boy band, New Edition. The trademark avoids that ambiguity, not to mention the rather inelegant phrasing. Second, courts consider whether the user included more of the trademark than necessary to identify the product. *USA Today* simply wrote the group's name in a standard typeface. It didn't reproduce the New Kids logo or any other marks associated with it. Finally, courts look at whether there is any suggestion that the trademark owner sponsored or endorsed the use. Had *USA Today* claimed it was running the "official" or "authorized" New Kids poll, that might have posed a problem. But in the absence of that kind of language, its reference to the group was perfectly lawful.

Nominative fair use offers part makers and repair providers considerable leeway to accurately relay information to consumers. A manufacturer of replacement touchscreens can explain that a particular model is compatible with the Samsung Galaxy Note 20 Ultra, but not the 20 Plus. And an appliance repair shop can let customers know they specialize in Frigidaire and Whirlpool models but refuse to work on Sub-Zero products. By the same token, the nominative fair-use test suggests certain limits. A repair shop would be wise not to litter its website or its fleet of vans with manufacturer logos, or to suggest they are authorized repair providers if they aren't, for example.

Although they haven't adopted the same nomenclature, European courts have reached similar results.[171] When the Court of Justice was asked to consider whether ads offering "Repairs and maintenance of BMWs" infringed the carmakers' marks, it explained that trademark owners have no power to "prohibit a third party from using the mark for the purpose of informing the public that he carries out the repair and maintenance of goods covered by that trade mark."[172] So repair

providers can communicate that they specialize in repairing those goods as long as they don't falsely imply an affiliation with the trademark holder.

More recently, the UK Court of Appeal, applying EU law, helped clarify the line between informing the public and implying an affiliation.[173] Again, BMW filed suit against a repair shop, Technosport. While BMW did not object to Technosport's use of the slogan "The BMW specialists," it argued that prominent use of the phrase "TECHNOSPORT-BMW," accompanied by the manufacturer's roundel logo, went too far. The court agreed. While its use of the mark to describe its services was legitimate, Technosport's use of the BMW logo would lead the average consumer to believe the company is an "authorised distributor." That conclusion is consistent with the likely outcome under the US nominative fair-use approach.

Exhaustion and Importation

Like other IP regimes, trademark law recognizes the principle of exhaustion. Under the first-sale doctrine, once a product bearing a trademark is sold, the trademark owner's ability to control its use and transfer is severely limited.[174] The law allows the sale of genuine goods bearing a trademark despite objections from the rights holder.[175] That rule helps explain why we have thriving markets for used cars, electronics, and clothing, among other goods. Nonetheless, trademark owners still try to clamp down on resale markets.[176] Recently, Chanel sued The RealReal, an online consignment shop for designer goods.[177] But since the site made it clear that its products were secondhand and independently authenticated, the court had no problem dismissing Chanel's claims.

But there are two scenarios that complicate the general rule favoring resale of authentic goods, both of which have implications for repair. First, resold goods are often not identical to new ones. If you sell your ten-year-old Prius, chances are good that some parts have been repaired or replaced. Beyond batteries, brakes, and tires, you may have replaced the coolant pump,

a cracked windshield, or body panels damaged in a collision. In some sense, the car you are selling isn't the Toyota you originally purchased. But under trademark law, the resale of refurbished products is lawful even if they are repaired by third parties using non-OEM parts.

In 1947, the US Supreme Court considered a trademark claim brought by Champion, the maker of automobile spark plugs, against Sanders, who reconditioned and resold used Champion products.[178] The Court was satisfied that so long as Sanders clearly labeled his goods as "repaired" products, he had no obligation to remove their Champion trademarks. As the Court understood, they were still Champion spark plugs, after all. Repair restored them as near as possible to their original condition. Even if they didn't perform as reliably as new spark plugs, that didn't matter as long as they were clearly labeled as refurbished.

Courts have gone further, endorsing the right of refurbishers to reapply trademarked logos to products before reselling them. For example, the makers of Titleist golf balls sued Nitro Leisure, a company that sold reconditioned balls.[179] Nitro collected used Titleist balls and removed layers of scuffed and damaged paint, taking the Titleist logo along with them. It would then apply new paint and faithfully reproduce the Titleist mark. Despite their inferior performance, Nitro was entitled to recreate the logo on reconditioned balls since they were clearly labeled. As the court understood, buyers of used goods, which often come at a steep discount, don't expect them to perform like new.

These protections for refurbished goods matter for repair in at least two ways. Reconditioned parts, like Champion spark plugs, offer a less expensive alternative to OEM parts. And for hard-to-find components, like those the original manufacturer no longer produces, a refurbished part may be the only option. What's more, the ability to resell refurbished goods is a key driver of repairs. Independent refurbishers like John Bumstead of RDKL, Inc. snap up broken laptops by the thousand, get them back in good working order, then resell them at a reasonable profit. If it weren't for the secondary market in refurbished

goods, these devices would either be recycled for scrap or dumped in landfills.

There's a second wrinkle in US trademark law's approach to the first-sale rule. If a product bearing a trademark differs in some material respect from those sold by the trademark owner, its resale is potentially infringing.[180] Typically, this rule applies to so-called grey-market goods – those produced for one country but sold in another. Let's say you want to import a Ford Focus from the United Kingdom into the United States. Aside from the driver's side being on the right, the car is virtually identical to its US counterpart. But that is a difference that would matter to most buyers. As a result, Ford has the power to prevent its importation and sale in the United States. That rule reflects the fact that the same trademark can represent two very different products in two jurisdictions. Courts have applied the same rule to products manufactured in the United States but destined for foreign markets.[181]

The key question in these cases is what counts as a material difference. Unfortunately, it's not a particularly exacting standard. As long as consumers would likely consider some variation between the products "significant" at the time of purchase, they are materially different.[182] And a single such distinction is all trademark owners have to show. So, what sorts of difference have courts found to be material? In a case about John Deere harvesters produced for European markets, the court found a material difference where the lights, turn signals, and hitch mechanisms functioned differently, features that were likely quite important to many farmers.[183] Another court determined that Kubota tractors produced in Japan were materially different from their US counterparts because their warning labels and service manuals were printed in Japanese, not English.[184]

But other examples stretch the meaning of materiality to its breaking point. After a distributor used an etching tool to remove batch codes from bottles of Cool Water cologne intended for duty-free stores, the trademark owner sued. Even though the fragrance, bottle, and packaging were identical, the court was satisfied that an etch mark on the bottle, about one

inch long and an eighth of an inch wide, was a material difference.[185] Other courts have even found material differences where there were no physical variations at all. In one instance, a one-year difference in the length of Bose radio warranties in the United States and Australia was enough to bar importation.[186] In another, the court was convinced that material differences could be established where ball bearings were sold with access to a technical support hotline, but imported bearings were not.[187]

Canada has also adopted the material-difference standard but tends to favor the free flow of goods in its application.[188] Where materially different goods sold under a trademark pose some risk of harm to the public, Canadian courts will intervene to stop their importation. So, courts may, for instance, bar the importation of damaged goods.[189] But where there is no risk to the public, or any harm can be avoided by labeling the products accurately, Canadian law applies the general first-sale rule.

Unlike the US and Canada, which have adopted international exhaustion regimes, Europe has embraced regional exhaustion. If a trademarked product is sold lawfully anywhere in the world, it can generally be imported into the United States as long as it was made by the US trademark holder or a related entity. But under European law, exhaustion is only triggered by sales within the European market. So, while sales in France might trigger exhaustion in the United States, the reverse isn't true. That gives companies greater leeway in Europe to halt imports of trademarked products or parts from outside the single market.

Like the material-difference standard, the first-sale rule doesn't apply under European trademark law if there are "legitimate reasons for the proprietor to oppose further commercialization of the goods, especially where the condition of the goods is changed or impaired after they have been put on the market."[190] For years, the European Court of Justice interpreted "legitimate reasons" narrowly. It allowed trademark owners to restrict the movement of goods that have been repackaged or

relabeled in ways that risk consumer confusion or reputational harm.[191] But it rejected efforts to characterize differences between products bearing the same mark as material when they were the byproduct of marketing efforts by the trademark owner.[192]

Nonetheless, there are some troubling signs. In *Copad v. Dior*, the court considered the sale of Dior corset dresses outside of the company's tightly controlled distribution network.[193] Like many luxury brands, Dior is selective about the sorts of retail establishments that carry its products. When discount retailer Copad began selling authentic Dior dresses, the fashion house sued. The court held that Dior could sidestep the first-sale rule where the distribution of the product "damages the allure and prestigious image which bestows on those goods an aura of luxury." In other words, the risk that Dior may lose some of its luster if its products are seen slumming it on the shelves of a discount store is a "legitimate reason" to interfere with the free movement of goods.

That reasoning would be problematic enough if it were confined to true luxury goods. But a recent decision applied this logic to inexpensive jewelry.[194] Nomination makes charms and links that can be combined into reconfigurable bracelets by consumers. The charms are sometimes, though not always, made of precious metals. The links are stainless steel. Nomination positions its products as "luxury jewelry which is nevertheless affordable by everyone." JSC produces interchangeable links, and sold bundles consisting of one of its own Daisy Charm links alongside a genuine Nomination link. The eBay listings for those bundles accurately described their contents, and the Nomination link was shipped with a label that read, "Manufactured by Nomination Italy Repackaged by JSC Jewelry UK." Nonetheless, Nomination objected to the resale of its products, arguing that JSC's packaging failed to convey the appropriate level of luxury. Even though Nomination's own authorized dealers sometimes sold links in small plastic bags, the UK Court of Appeal was satisfied that Nomination had a legitimate reason to halt sales. If an $18 stainless steel bracelet

link counts as a luxury good, that term has lost all meaning. That reasoning would seem to open the door to restricting resale of $1,000 smartphones that come in carefully designed packages.

Restrictions on grey-market imports can create real problems for repair providers. Since electronics manufacturers often refuse to sell replacement parts directly to independent repair shops, they are forced to rely on the grey market. These parts are sourced in a variety of ways, but generally take advantage of the complex global supply chains firms like Apple rely on. When Apple contracts with manufacturers to build screens, batteries, or other components, some of those parts eventually end up in the hands of third-party repair providers. Some are diverted from production lines. Others fail diagnostic tests and are then refurbished. These components are built in the same factories, by the same workers, and to the same standards as those used by trademark owners. But for a repair shop ordering parts an ocean away, those original parts aren't always easy to separate from copies produced by third parties.[195] And sometimes a component will intermingle third-party and original parts.[196]

Regardless of their source, manufacturers have strong incentives to use trademark law's relatively favorable rules around importation to clamp down on the flow of replacement parts. In order to invoke trademark law, however, you need a trademark. This explains why companies like Apple include logos on internal parts like batteries, processors, and cables. Most consumers never set eyes on these internal components, and almost certainly don't take notice of the logos, some no bigger than a grain of rice.[197] If a third party reproduces Apple's logo, those parts are likely infringing. But under the material-difference test, Apple could arguably block the importation of new and refurbished authentic parts, so long as it argues that warranty service or other benefits are unavailable to grey-market components.

Apple's naked attempt to use trademarks to restrict competition is one some courts would rightly regard with skepticism. But since US law allows for border seizures of allegedly infringing goods, Apple can rely on nonjudicial procedures with little

due process or substantive oversight. When Jessa Jones, a prominent repair professional, tried to import replacement iPhone screens incorporating an authentic Apple flex cable bearing the company's logo, the Department of Homeland Security seized them.[198] Similarly, DHS seized authentic Apple batteries shipped to Louis Rossmann, an outspoken independent repair provider and advocate.[199]

A 2020 decision from the Supreme Court of Norway helps illustrate the bind Apple's restrictions on replacement parts create for repair providers.[200] Henrik Huseby operates a small electronics repair business. In 2017, he ordered sixty-three iPhone screens, which he believed were refurbished Apple components, from a supplier in Hong Kong. Replacement screens typically consist of a number of parts: an LCD display, a glass face, an outer frame, and a flex cable that connects the display to the logic board. Apple includes a tiny logo, no more than a couple of millimeters wide, on its flex cables.

Norwegian customs officials seized Huseby's shipment. According to their report, the flex cables featured Apple logos that had been obscured with black ink. Apple insisted it hadn't applied the logos and that the screens were counterfeits. So, the company demanded they be destroyed. Whether the displays themselves were authentic Apple products refurbished with new glass remains unclear since the dispute focused almost exclusively on the provenance of the tiny Apple logos on the cables.

Huseby argued that importation of the screens was lawful for two reasons. First, even if the Apple logos were fake, they were covered by black ink. Unless he carefully removed the ink from each cable, no one would have reason to believe they were made by Apple. Second, even if the counterfeit logos were exposed, flex cables are internal components buried deep inside the phone's inner workings. Consumers would only see them if they disassembled their phones. So, the risk of consumer confusion or harm to Apple's legitimate trademark interests was minimal and hypothetical. But according to the court, the fact that the logos were hidden didn't

"permanently remove the danger" that they could harm Apple. Huseby lost his appeal and was ordered to pay Apple's legal costs, roughly $28,000.

Frustratingly, the uncertain origins of imported parts are a problem of Apple's own making. The reason that Huseby, Jones, and Rossmann are forced to scour the globe looking for high-quality refurbished and third-party parts is Apple's refusal to sell replacement components outside of its tightly controlled and ultimately untenable Independent Repair Provider program. If Apple made those parts available to repair providers on reasonable terms, most would happily buy them. Having denied repair shops access to its stock of new, original parts, Apple is trying to use trademark law to choke off the supply of grey-market, refurbished, and third-party parts as well. Trademark law is meant to prevent unfair competition, but too often manufacturers use it to undermine any competition in the repair market.

Trade Secrets

The final weapon in the manufacturer's IP arsenal is trade secrecy. Trade-secret law prohibits the improper acquisition and use of valuable, secret information. Historically, trade secrets were protected under state law in the United States, with forty-eight of the fifty states adopting some version of the Uniform Trade Secrets Act.[201] In 2016, Congress enacted the Defend Trade Secrets Act, which added a new federal cause of action for trade-secret misappropriation.[202] That same year, the Directive on the Protection of Trade Secrets harmonized European trade-secret law.[203] With some notable exceptions discussed below, the basic contours of EU trade secrecy are consistent with US state and federal law.

A trade secret is any information that is economically valuable because it isn't generally known and is subject to reasonable efforts to keep it secret. Technical information, like the formula for Coca-Cola or the process of manufacturing Kevlar, can be a trade secret, as can less-exciting business information,

like marketing plans and customer lists. If the information is valuable, not generally known, and subject to efforts to maintain secrecy, the law prohibits its misappropriation.[204]

A trade secret is misappropriated if it is acquired through improper means.[205] Those include heist-movie theatrics like hacking, sneaking into secure facilities, or drone surveillance. Most of the time, though, the focus is on more mundane behavior, like breaching a confidentiality agreement or the implied duties of an employment relationship. In addition, the disclosure or use of a trade secret counts as misappropriation, so long as the person doing the using or disclosing knew or had reason to know that it was acquired through improper means.

When it comes to repair, manufacturers insist that service manuals, diagnostic information, schematics, and repair techniques are valuable secrets. Toshiba, for example, has demanded removal of its manuals from websites that distributed them for free to owners and repair providers.[206] More recently, ventilator makers raised similar concerns.[207] And in the ongoing policy debates around repair, firms often make vague, unsubstantiated assertions that sharing repair information with consumers or third-party repairers would result in the loss of valuable, if unspecified, secrets.[208]

But these trade-secret claims face a number of pitfalls. First, not every acquisition of secret information is improper. Crucially, trade-secret law allows reverse engineering – the process of examining a product to discover how it works. If you independently discover the process for replacing a Tesla battery, using or sharing that technique is not misappropriation – even assuming it counts as a trade secret.[209] So when a site like iFixit carefully dissects a new Microsoft tablet, documenting the repair process in a step-by-step guide, there is no misappropriation. All the information was independently derived.[210]

Second, not everything a company claims as a secret actually is one. In some instances, information may be so easy to acquire that it can't be considered a secret in the first place. Trade secrecy does not extend to information that is "readily

ascertainable."[211] In other words, if someone else could easily uncover the information through books, journals, or other publicly available information, there is no secret to protect, regardless of how the information was obtained. Let's say a local dog walker considers her customer list a trade secret. She keeps the names of her clients on an encrypted drive stored in an elaborate biometric security system. To figure out who her customers are though, all you'd have to do is follow her van for a day to see which dogs she picks up on her way to the park. If you broke into her home, stole the drive, and decrypted it, you would have violated a slew of laws. But you wouldn't have misappropriated a trade secret. Because the information you took was readily ascertainable, it was never a secret to begin with.

The same is true for information that is generally known. The maker of an electric car may insist that the procedure for changing its batteries is a trade secret, but if most mechanics in the business know how it's done – and aren't bound by confidentiality agreements – the process isn't a secret. So, posting a detailed repair guide or the official service manual is perfectly lawful. As we all remember from high school, once a secret is out in the world, there's no way to reel it back in. That means that if disclosure is wide enough, an initial act of misappropriation can destroy a trade secret.

That's what the court determined when the DVD Copy Control Association (CCA) sued Andrew Bunner.[212] DVD CCA controlled CSS, a software tool used to encrypt virtually all commercially available DVDs. After Jon Johansen, a Norwegian teenager, wrote a program called DeCSS that decrypted DVDs, it quickly spread across the internet. Bunner was one of hundreds who posted the code online. DVD CCA sued him for trade-secret misappropriation. But as the court noted, if DeCSS was already public knowledge, there was no secret left for Bunner to disclose. Where an "initial publication [is] quickly and widely republished to an eager audience," others are free to republish that information. The same was true when the Church of Scientology sued a former member who shared church documents online.[213] As the court explained, since

"the documents have escaped into the public domain and onto the Internet," the disgruntled member wasn't the only source of the once-secret information. As a result, the church couldn't establish that the documents were "not generally known." That rule doesn't eliminate the threat of liability for the first person to acquire or disclose the secret, but subsequent publishers are insulated from legal risk.

Sometimes, there are good reasons to divulge secrets. If a carmaker cheats on emissions tests, a telecommunications company cooperates in government surveillance, or an energy firm engages in accounting fraud, the public ought to know. But unlike other forms of IP, trade secrecy hasn't recognized the doctrines of fair use or misuse, which might protect those sorts of disclosures. Deepa Varadarajan has argued persuasively that trade-secret law should incorporate such rules.[214] At times, trade-secret owners have aggressively asserted their rights in order to muzzle whistleblowers and suppress criticism on issues of public health and safety, ranging from the dangers of breast implants, the environmental harms of pollutants, and the integrity of voting systems.[215]

Partly in recognition of these concerns, both the EU Trade Secret Directive and the federal Defend Trade Secrets Act (DTSA) incorporate some whistleblower protections. The DTSA's safe harbor is quite narrow. It protects whistleblowers when they report confidential information to government officials, but only "for the purpose of reporting or investigating a suspected violation of law."[216] The EU provision is significantly broader. Under its terms, trade secrecy does not prevent the disclosure if it "serves the public interest, insofar as directly relevant misconduct, wrongdoing or illegal activity is revealed." Although US statutes do not explicitly recognize the public interest, the Restatement (Third) of Unfair Competition, an influential distillation of case law, suggests that courts are likely to permit "the disclosure of information that is relevant to public health or safety, or to the commission of a crime or tort, or to other matters of substantial public concern."[217] But few courts have taken up that recommendation.

The EU Directive protects "the right to freedom of expression and information."[218] US trade-secret law does not include any explicit safeguards for free speech, but both state and federal statutes are subject to general First Amendment protections. Constitutional challenges to trade-secret claims are rare, as Pamela Samuelson has explained.[219] In most cases, defendants want to maintain the secret for their own commercial gain, rather than publicize it. Although uncommon, First Amendment defenses have succeeded on occasion. When a meat-packing plant sued to stop CBS from broadcasting footage secretly shot by a plant employee, Justice Blackmun determined that an injunction preventing the broadcast of the footage would be "intolerable under the First Amendment."[220]

Similarly, when a website posted an internal Ford memo that discussed fuel economy and emissions strategies, as well as powertrain technology advances, the court refused to enjoin publication, citing the First Amendment.[221] A California court reached a similar result when Apple sued a news site for publishing information about an impending product release. As the court explained, the site didn't take the secrets "for venal advantage." Instead, it was engaged in "a journalistic disclosure" to the public. In a conflict between trade secrets and free speech, "it is the quasi-property right that must give way, not the deeply rooted constitutional right to share and acquire information."[222]

Trade secrets, in other words, sometimes have to yield to other public policy priorities. The Securities and Exchange Commission demands detailed financial disclosures from companies.[223] The Internal Revenue Service insists that nonprofit organizations disclose their funding sources, expenditures, and employee salaries.[224] And the Food and Drug Administration requires clinical trial disclosures for pharmaceuticals, as well as food labels that reveal ingredients and other potentially valuable information.[225] In many cases, this information is shared with the public, despite the fact that organizations would prefer to keep it secret. When the health, safety, and wellbeing of the public are at stake, lawmakers and regulators can compel disclosure. In light of the

economic and environmental stakes, there is a strong case for demanding firms share information necessary to maintain and repair the products they sell regardless of claims of trade secrecy.

Repair and "Progress"

The primary justification underlying intellectual property is the law's promise to encourage investment in creativity and innovation. The market exclusivity conferred by copyrights, patents, and, to a lesser extent, trade secrets is designed to create strong economic incentives for firms to develop valuable intangible assets. In the United States, that rationale can be traced back to the Constitution, which empowers Congress to enact copyright and patent protection in order "to promote the progress of science and useful arts."[226]

As we've already seen, that directive to promote progress doesn't necessarily trump all other considerations. The law takes other values into account. It accommodates free expression, competition, personal privacy, among other priorities. US patent law even gives doctors the right to perform patented medical procedures without fear of liability – not because it promotes innovation, but because patient welfare is more important than the dollar value of an invention.[227] A strong case can be made that repair – because of the benefits it offers for the environment, the economy, and personal autonomy – should be similarly prioritized. If broad intellectual property rights interfere with repair, so much the worse for IP law. As this chapter has detailed, various legal doctrines already recognize the value of repair. Others should be expanded and reinforced to better reflect the central importance of repair to our environmental and economic futures.

Even within the internal logic of intellectual property law, repair deserves greater emphasis. Rather than a purely countervailing consideration, repair is intertwined with questions of innovation and progress. Our approach to repair influences what sort of innovations we are likely to see, who can access

them, and under what conditions. In that sense, our attitudes about repair reflect what sort of technological and social progress we value. For all its rhetoric about progress and innovation, intellectual property policy engages in precious little examination of precisely what kind of new works it's designed to create. From patent law's perspective, a patent on out-of-office emails[228] is just as valuable as gene-editing technology.[229] And copyright law draws no distinction between your dressing-room photos of potential outfits and Waxahatchee's masterful 2020 album, *Saint Cloud*.[230]

But if we believe that law influences creative production, how we calibrate the scope and shape of IP law will change the sorts of products that system produces. So, when the law restricts repair, it encourages shorter product lifecycles that favor superficial product differentiation. If companies can wield IP to discourage repair, they will tend to focus their efforts on rolling out a reliable stream of minor updates and aesthetic tweaks. But annual product releases aren't compatible with truly innovative breakthroughs, at least not on any regular basis. Even if Apple, Samsung, and other device makers could churn out major new features every year, why bother? People need phones, cars, and dishwashers. If they can't fix their current devices, they'll buy new ones even without new major technological advances. In contrast, an environment that encourages repair creates stronger incentives for genuine innovation. If you can reliably and cheaply keep your four-year-old phone or decade-old car working, you're more likely to hold out for some significant new functionality before replacing it. Repair might even encourage what the economist Joseph Schumpeter called creative destruction, the process by which old technologies are displaced by new ones.[231] If firms couldn't rely on tens of billions of dollars in annual revenue from new smartphone sales, maybe they would turn more attention to new, as-yet-unimagined product categories.

If we take a broader view of progress, as Leah Chan Grinvald and Ofer Tur-Sinai have suggested, the value of repair becomes even more apparent.[232] Progress isn't achieved simply because

firms invent new technologies or authors pen brilliant novels. For the value of those contributions to be realized, they have to be accessible to the public. Broad public access is, in some sense, at odds with the economic theory of intellectual property, which is premised on market exclusivity and the high prices it enables. But the law has long reflected the need to balance those competing interests. As the US Supreme Court wrote in 1974, the ultimate goal of patent law is to produce "a positive effect on society through the introduction of new products [that] better lives for our citizens."[233] A year later, the Court explained that copyright law "must ultimately serve the cause of promoting broad public availability of literature, music, and the other arts."[234] As we have seen, by supporting secondary markets and the longevity of devices more generally, repair helps get technology in the hands of those who cannot otherwise afford it.

Beyond the question of access, a holistic view of progress ought to account for the changing conditions we collectively face, climate change and other environmental threats among them. A notion of progress that gives us Wi-Fi-enabled coffeemakers and an endless supply of Snapchat filters, all while sea levels rise, potable water grows scarce, and extreme weather endangers communities is a fundamentally hollow one.[235] That's not to say new technologies, from green energy to desalination, might not help us address these threats. But an IP system that incorporates sustainability into its understanding of progress is better equipped to serve the needs of society than one that doesn't. And embracing repair is the simplest step towards a sustainable vision of technological progress.

5 Repair and Intellectual Property

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157. Jason Kilar, *What's in a Name?*, Hulu (May 13, 2008), https://web.archive.org/web/20181031160852/http://blog.hulu.com/2008/05/13/meaning-of-hulu/.
158. *Abercrombie*, 537 F.2d at 10.
159. Wal-Mart Stores, Inc. v. Samara Bros., 529 U.S. 205, 212 (2000). According to the Supreme Court, unlike product design, product packaging may sometimes be inherently distinctive.
160. Koninklijke Philips Electronics NV v. Remington Consumer Products Ltd., 2002 E.C.R. I-05475; Joined Cases C-53–55/01, Linde AG, Judgment, 2003 E.C.R. I-3177; Joined Cases C-456–57/01 P, Henkel KGaA v. OHIM, Judgment, 2004 E.C.R. I-5115. *See also* César J Ramírez-Montes, *The Elusive Distinctiveness of Trade Dress in EU Trademark Law*, 34 Emory International Law Review 277 (2020).
161. C-417/16, August Storck KG v. EUIPO, ECLI:EU:C:2017:340 (2017).
162. TrafFix Devices, Inc. v. Marketing Displays, Inc., 532 U.S. 23 (2001).
163. Directive (EU) 2015/2436, art. 4(1); Regulation (EU) 2017/1001, art. 7(1).

164. The mark consists of a configuration of a vehicle grille, Registration No. 3,453,754 (Ford Motor Company registration for the design of an automobile grille); The mark consists of a configuration of a vehicle taillight design, Registration No. 3,440,628 (Volvo Car Corporation registration for the design of car taillights); Leah Chan Grinvald & Ofer Tur-Sinai, *Intellectual Property Law and the Right to Repair*, 88 Fordham Law Review 63 (2019).
165. Gen. Motors Corp. v. Lanard Toys, Inc., 468 F.3d 405, 420 (6th Cir. 2006).
166. Chrysler Corp. v. Vanzant, 44 F. Supp. 2d 1062, 1071–72 (C. D. Cal. 1999).
167. Apple, Inc. v. Samsung Electronics Co., Ltd., 786 F.3d 983 (2015).
168. 15 U.S.C. § 1114.
169. Volkswagenwerk Aktiengesellschaft v. Church, 411 F.2d 350, 351 (9th Cir. 1969).
170. *See also* Hypertherm, Inc. v. Precision Products, Inc., 832 F. 2d 697 (1st Cir. 1987) ("In the absence of false representations or palming off, the sale of unpatented replacement parts by one other than the manufacturer of the original equipment is neither unlawful nor actionable.").
171. Under Article 12 of the Trade Mark Directive and Article 14 of the Regulation, a trade mark "shall not entitle the proprietor to prohibit a third party from using in the course of trade: . . . indications concerning the kind, quality, quantity, intended purpose, value, geographical origin, the time of production of the goods or of rendering of the service, or other characteristics of the goods or service; [or] the trade mark where it is necessary to indicate the intended purpose of a product or service, in particular as accessories or spare parts, provided he uses them in accordance with honest practices in industrial or commercial matters." Council Directive 2015/2436; Council Regulation 2017/1001.
172. Case C-63/97, Bayerische Motorenwerke AG and another v. Deenik [1999] ETMR 339.
173. Bayerische Motoren Weke AG v. Technosport London Ltd. [2017] EWCA Civ 779, No. A3 2016 1801.

174. Sebastian Int'l, Inc. v. Longs Drug Stores Corp., 53 F.3d 1073, 1074 (9th Cir. 1995) (the right "to control distribution of its trademarked product does not extend beyond the first sale of the product").
175. Zino Davidoff SA v. CVS Corp., 571 F.3d 238, 243 (2d Cir. 2009).
176. Yvette Joy Liebesman & Benjamin Wilson, *The Mark of a Resold Good*, 20 George Mason Law Review 157 (2012).
177. Chanel, Inc. v. RealReal, Inc., 449 F. Supp. 3d 422 (S.D.N.Y. 2020).
178. Champion Spark Plug Co. v. Sanders, 331 U.S. 125 (1947).
179. Nitro Leisure Prod., L.L.C. v. Acushnet Co., 341 F.3d 1356, 1357 (Fed. Cir. 2003).
180. *See* Societe Des Produits Nestle, S.A. v. Casa Helvetia, Inc., 982 F.2d 633, 635 (1st Cir. 1992).
181. Bourdeau Bros. v. Int'l Trade Comm'n, 444 F.3d 1317 (Fed. Cir. 2006). On occasion, courts have applied a similar rule to purely domestic sales when the reseller fails to comply with the trademark owner's quality control measures. *See* Warner-Lambert Co. v. Northside Dev. Corp., 86 F.3d 3, 6 (2d Cir. 1996) (determining that the sale of cough drops past their expiration date was infringing).
182. *Bourdeau Bros.*, 444 F.3d at 1323–24.
183. *Id*.
184. Gamut Trading Co. v. U.S. Int'l Trade Comm'n, 200 F.3d 775, 781 (Fed. Cir. 1999). The court reached a similar result in a case about imported mushrooms, but there, in addition to the languages on the labels, the US mushrooms were certified organic, but the Japanese variety were not. Hokto Kinoko Co. v. Concord Farms, Inc., 738 F.3d 1085, 1094 (9th Cir. 2013).
185. Davidoff & CIE, S.A. v. PLD Int'l Corp., 263 F.3d 1297, 1302 (11th Cir. 2001).
186. Bose Corp. v. Ejaz, No. CIV.A. 11–10629-DJC, 2012 WL 4052861, at *8 (D. Mass. Sept. 13, 2012), aff'd, 732 F.3d 17 (1st Cir. 2013).
187. Ultimately, the court held that since the trademark holder failed to make those services available to all customers, it could not prove that substantially all imported goods were materially different. SKF USA, Inc. v. Int'l Trade Comm'n, 423 F.3d 1307, 1308 (Fed. Cir. 2005); *see also* Heraeus Kulzer LLC

v. Omni Dental Supply, No. 12–11099-RGS, 2013 U.S. Dist. LEXIS 91949, at *17–18 (D. Mass. July 1, 2013) (finding material difference due to variations in customer support and warranty coverage between foreign and domestic products).

188. Irene Calboli, Market Integration and (the Limits of) the First Sale Rule in North American and European Trademark Law, 51 Santa Clara Law Review 1241 (2011).
189. Dupont of Canada Ltd. v. Nomad Trading Co. (1968), 55 C.P.R. 97 (Can. Que. S.C.).
190. TM Directive (Art. 7) and the CTM Trademark Regulation (art. 13).
191. *See* Joined Cases C-427, C-429, and C-436/93, Bristol-Myers Squibb v. Paranova A/S, 1996 E.C.R. 1–3457, 1–3536–45; Case C-379/97, Pharmacia & Upjohn SA v. Paranova A/S, 1999 E.C.R. 1–6927; Irene Calboli, *Market Integration and (the Limits of) the First Sale Rule in North American and European Trademark Law*, 51 Santa Clara Law Review 1241 (2011).
192. *Id*.
193. Case C-59/08, Copad SA v. Christian Dior Couture SA; *see also* Irene Calboli, *Reviewing the (Shrinking) Principle of Trademark Exhaustion in the European Union (Ten Years Later)*, 16 Marquette Intellectual Property Law Review 257 (2012).
194. Brealey v. Nomination De Antonio E Paolo Gensini SNC [2020] EWCA Civ 103.
195. Jason Koebler, *Apple Sued an Independent iPhone Repair Shop Owner and Lost*, Vice (Apr. 13, 2018), www.vice.com/en_us/article/a3yadk/apple-sued-an-independent-iphone-repair-shop-owner-and-lost.
196. Jason Koebler, *DHS Seizes Aftermarket iPhone Screens from Prominent Right-to-Repair Advocate*, Vice (May 11, 2018), www.vice.com/en_us/article/evk4wk/dhs-seizes-iphone-screens-jessa-jones.
197. *Id*.; *iPhone XS and XS Max Teardown*, iFixit (Sept. 21, 2018), www.ifixit.com/Teardown/iPhone+XS+and+XS+Max+Teardown/113021.
198. Koebler, *supra* note 196.
199. Matthew Gault & Jason Koebler, *DHS Seized Aftermarket Apple Laptop Batteries from Independent Repair Expert Louis Rossmann*, Vice (Oct. 19, 2018), www.vice.com/en_us/arti

cle/a3ppvj/dhs-seized-aftermarket-apple-laptop-batteries-from-independent-repair-expert-louis-rossman.

200. Huseby v. Apple, Inc., HR-2020–1142-A (sak nr. 19-141420SIV-HRET).
201. New York and North Carolina are the remaining holdouts. Uniform Law Commission, *Trade Secrets Act*, www.uniformlaws.org/committees/community-home?communitykey=3a2538fb-e030-4e2d-a9e2-90373dc05792&tab=groupdetails.
202. 18 U.S.C. § 1836, et seq.
203. Directive (EU) 2016/943.
204. *Id*.; 18 U.S.C. § 1839; Uniform Trade Secrets Act § 1.
205. *Id*.
206. Toshiba insists its repair manuals are available only to authorized parties under strict confidentiality agreements. *See* Letter from John Ryan to Tim Hicks (July 31, 2012), www.wired.com/wp-content/uploads/blogs/opinion/wp-content/uploads/2012/11/toshiba_timhicks_takedownletter.jpeg.
207. Koebler, *supra* note 196.
208. *See* Leah Chan Grinvald & Ofer Tur-Sinai, *Smart Cars, Telematics and Repair*, 54 University of Michigan Journal of Law Reform (2021).
209. Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470 (1974) ("discovery by fair and honest means, such as by independent invention, accidental disclosure, or by so-called reverse engineering").
210. *See* Chicago Lock Co. v. Fanberg, 676 F.2d 400 (9th Cir. 1981).
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212. DVD Copy Control Assn., Inc. v. Bunner, 116 Cal. App. 4th 241, 251, 10 Cal. Rptr. 3d 185, 193 (2004).
213. Religious Technology Center. v. Lerma, 897 F. Supp. 260, 266 (E.D. Va. 1995).
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215. Annemarie Bridy, *Trade Secret Prices and High-Tech Devices: How Medical Device Manufacturers Are Seeking to Sustain Profits by Propertizing Prices*, 17 Texas Intellectual Property Law Journal 187 (2009); David S. Levine, *Secrecy and Unaccountability: Trade Secrets in Our Public Infrastructure*, 59

Florida Law Review 135 (2007); Mary L. Lyndon, *Secrecy and Access in an Innovation Intensive Economy: Reordering Information Privileges in Environmental, Health, and Safety Law*, 78 University of Colorado Law Review 465 (2007).
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220. CBS, Inc. v. Davis, 510 U.S. 1315, 1318 (1994).
221. Ford Motor Co. v. Lane, 67 F. Supp. 2d 745 (E.D. Mich. 1999).
222. O'Grady v. Superior Court, 139 Cal. App. 4th 1423, 1475 (6th Dist. 2006).
223. Grinvald & Tur-Sinai, *supra* note 164.
224. *See* 26 U.S.C. § 6033; Guidance under Section 6033 Regarding the Reporting Requirements of Exempt Organizations, 85 Federal Register 31959 (May 28, 2020).
225. Nutrition Labeling and Education Act of 1990 (Public Law 101–535).
226. US Constitution, art. 1, § 8, cl. 8.
227. 35 U.S.C. § 287(c).
228. US Patent No. 9,547,842 (issued Jan. 17, 2017).
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230. Ben Beaumont-Thomas, *Waxahatchee: Saint Cloud Review – The Best Album of the Year So Far*, The Guardian (Mar. 27, 2020), www.theguardian.com/music/2020/mar/27/waxahatchee-saint-cloud-review.
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233. Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 480 (1974).
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6 Repair and Competition

1. Majority Staff of Subcommittee on Antitrust, Commercial & Administrative Law, House Committee on the Judiciary