

“SUBSTANTIAL EMBODIMENTS” AND “READILY REPLACEABLE PARTS”: A CONTEMPORARY UNDERSTANDING OF THE DOCTRINE OF PERMISSIBLE REPAIR

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I. INTRODUCTION

Under United States patent law, a patent owner has the exclusive right to “make” the patented invention.¹ The Supreme Court has defined “making” very simply as “construction of the thing invented.”² This construction qualifies as infringement even if the defendant does not use or sell what was made.³ Thus, under that rule, a party who simply makes a patented machine from scratch has committed an act of infringement—unless, of course, the machine is made pursuant to a license from the patent owner.⁴

On the other hand, U.S. courts also recognize that a person who has purchased or otherwise legitimately acquired a patented machine has a right to repair that machine.⁵ Even though the act of converting a broken or malfunctioning machine into a fully functional one might seem to qualify as a “making,” courts do not impose liability for activities deemed to be “repair.”⁶ However, the exact nature of this “right to repair” is somewhat amorphous and drawing the line between a permissible “repair” and an infringing “making” has been a challenge to the courts.⁷

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¹ 35 U.S.C. § 154(a)(1) (“Every patent shall . . . grant to the patentee . . . the right to exclude others from making . . . the invention.”).

² *Bauer & Cie v. O’Donnell*, 229 U.S. 1, 10 (1913).

³ 35 U.S.C. § 271(a).

⁴ 5 DONALD S. CHISUM, CHISUM ON PATENTS, § 16.02[3][a] (2019) (stating that 35 § 271(a) “codifies the long-standing rule that making a patented product without use or sale will constitute infringement”).

⁵ *Id.* at § 16.03[1].

⁶ *Id.*

⁷ See *infra* Parts II and III.

For example, a patented item that used to be popular before the prevalence of smartphones was the disposable camera. The construction of these cameras was quite simple, primarily consisting of a plastic/cardboard shell unit, a lens, an eyepiece, a shutter, a roll of film, a wheeled mechanism to advance the roll of film, and, in some cases, a flash bulb.⁸ The cameras allowed the consumer to take pictures until the film inside the camera was used up, at which point the entire camera could be sent to a developer who would retrieve the film inside the camera for processing.⁹ The “shells” of these cameras and all remaining components were then discarded by the developer.¹⁰ Fuji Film Company (“Fuji”) held patents on a number of such devices or components thereof.¹¹ It may seem obvious that if a party manufactured disposable cameras identical to those patented by Fuji, without Fuji’s permission and from components not made or sold by Fuji, such an act would constitute an infringing “making.”¹² It may be less intuitive, however, that purchasing the discarded “shells” of these Fuji cameras, refitting the shells with a new roll of film, resetting the film advancing wheel, and resealing the shell to recreate the camera does not violate any of Fuji’s patent rights—even if done without Fuji’s consent.¹³

The latter fact pattern was based on a case decided by the Federal Circuit in 2001, *Jazz Photo Corp. v. ITC*.¹⁴ In *Jazz Photo*, the Court stated that, because the process in question only involved reusing original parts of the camera and replacing an unpatented part (the film), the “making” was not an infringement.¹⁵ The rationale applied by the Federal Circuit is logical on its face. The defendant legitimately acquired a “piece” of the patented camera.¹⁶ This piece was manufactured by Fuji, not an infringing third party.¹⁷ And, while the camera as a whole was patented, the defendant only replaced the film—a component with no separate patent protection.¹⁸ It seems, then, that the Federal Circuit’s decision was sensible and fair in these circumstances.

⁸ See *Jazz Photo Corp. v. ITC*, 264 F.3d 1094, 1099 (Fed. Cir. 2001).

⁹ *Id.*

¹⁰ See *Kodak Recycling*, N.Y. TIMES at 35 (Feb. 10, 1990), <https://www.nytimes.com/1990/02/10/business/kodak-recycling.html> [<https://perma.cc/Z8JG-GBAR>].

¹¹ *Jazz Photo Corp.*, 264 F.3d at 1098.

¹² See 35 U.S.C. § 154(a)(1).

¹³ *Jazz Photo Corp.*, 264 F.3d at 1101, 1107.

¹⁴ *Id.* at 1099–101. In the actual case, *Jazz Photo* also “replac[ed] the winding wheel or modifi[ed] the film cartridge to be inserted” and “replac[ed] the battery in flash LFFPs[.]” *Id.* at 1100.

¹⁵ *Id.* at 1107.

¹⁶ *Id.* at 1099 (finding that discarded shells were purchased by *Jazz Photo*).

¹⁷ *Id.* at 1107 (finding that the reused components were from the original Fuji cameras).

¹⁸ *Id.*

However, suppose the only individually patented part of the camera was the flash bulb. Would the defendant's legitimate purchase of only the flash bulb give them the right to recreate the Fuji camera in its entirety from the remaining unpatented parts? While this may seem like a nonsensical or extreme hypothetical, it precisely illustrates the nature of a puzzling question that has not been directly answered by the Supreme Court: how much of a patented article does one have to possess in order to maintain the right to legally complete the article with unpatented parts?

The uncertainty about the answer to this question has resulted in a body of caselaw that is sometimes inconsistent and often unpredictable.¹⁹ Specifically, courts at every level have struggled to determine the type and extent of repairs that can be performed on a given patented article before a permissible "repair" crosses the line to become an impermissible "reconstruction."²⁰ The ambiguity of the holdings in these cases has also left patent law practitioners unsure about how to avoid or enforce infringement claims based on impermissible reconstruction.²¹ Repair-reconstruction questions involving so-called "combinations"—patented inventions comprised of multiple subcomponents—have posed a particular set of challenges.²² Since nearly all mechanical patents are "combination patents,"²³ the lack of clarity on how to resolve repair disputes has a disparate impact on this area of patent law.²⁴

A survey of relevant holdings from the U.S. Supreme Court, the U.S. Court of Appeals for the Federal Circuit, and some lower federal courts reveals that a workable resolution to the repair-reconstruction dichotomy is attainable.²⁵ This Note will show how concepts that have already been established by various courts can be synthesized to arrive at a standard for evaluating questions of permissible repair. The resolution that is put forth in

¹⁹ See CHISUM, *supra* note 4, at § 16-159 (1997) ("The line between permissible 'repair' and impermissible 'reconstruction' is a difficult one to draw and is the subject of numerous cases.")

²⁰ See *Husky Injection Molding Sys. v. R&D Tool & Eng'g Co.*, 291 F.3d 780, 784–85 (Fed. Cir. 2002) (acknowledging the lack of clarity on the subject and stating, "[t]he Supreme Court and this court have struggled for years to appropriately distinguish between repair of a patented machine and reconstruction").

²¹ See *FMC Corp. v. Up-Right, Inc.*, 21 F.3d 1073, 1078 (Fed. Cir. 1994) (discussing that petitioner requested a clearer standard and the request was denied).

²² See David B. Orange, *Part of a Larger Whole: How Combination Patents Show That Patent Exhaustion is Part of Patent Misuse*, 100 J. PAT. & TRADEMARK OFF. SOC'Y 130, 133 n.13 (2018). The use of the term "combination patent" in this Note is analogous to its use in Orange's article.

²³ See *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1540 (Fed. Cir. 1983) ("It is difficult to visualize, at least in the mechanical-structural arts, a 'non-combination' invention, i.e., an invention consisting of a single element.")

²⁴ Orange, *supra* note 22.

²⁵ See *infra* Part IV.

this Note is consistent with current jurisprudence and addresses concerns of practitioners by incorporating certain elements of frameworks proposed by other commentators in the field. The two key elements of this resolution are the concepts of a “substantial embodiment” and “readily replaceable parts.” Each of these ideas will be addressed in the sections that follow. First, however, a brief discussion of the history of the repair-reconstruction doctrine is appropriate for contextualizing of the proposed framework.

II. BACKGROUND

A. Origins of Repair Versus Reconstruction

1. Early Caselaw

One of the earliest cases involving a question of repair versus reconstruction was *Wilson v. Simpson*, addressed by the U.S. Supreme Court in 1850.²⁶ Here, the Court had to decide whether the owner of a patented wood-planing machine violated the patentee’s rights by replacing the cutting-knives on the machine once the knives became dull.²⁷ The Court ultimately held that, while the owner of a patented item does not have the right to rebuild the item once it ceases to exist, the owner has the right to repair worn or broken elements.²⁸ Critical to its decision, the Court noted, was the fact that the machine “will last in use for several years, but that its cutting-knives will wear out and must be replaced at least every sixty or ninety days.”²⁹ The Court reasoned that “[t]he right of the assignee to replace the cutter-knives is not because they are of perishable materials, but because the inventor of the machine has so arranged them as a part of its combination, that the machine could not be continued in use without a succession of knives at short intervals.”³⁰

In 1882, the Court came to a different conclusion in *Cotton-Tie Co. v. Simmons* when it held that the defendants were liable for infringing three patents on cotton-bale ties.³¹ In *Cotton-Tie Co.*, the metal ties were used when transporting cotton bales to the cotton-mill and then cut in preparation for milling.³² Each tie was stamped with the phrase “licensed to use once only.”³³

²⁶ 50 U.S. 109 (1850).

²⁷ *Id.* at 125.

²⁸ *Id.* at 124.

²⁹ *Id.* at 125.

³⁰ *Id.*

³¹ 106 U.S. 89, 95 (1882).

³² *Id.* at 91.

³³ *Id.*

The defendants collected the cut ties and used the materials to construct new bale ties.³⁴ In its holding, the Court seemed to deem important the fact that the ties were voluntarily destroyed and, upon doing so, the ties ceased to exist for the purpose of baling cotton.³⁵ Thus, the Court held, the defendants "reconstructed" the bale ties when they pieced together fragments of the old ties.³⁶

Wilson v. Simpson and *Cotton-Tie Co. v. Simmons* represent two opposing ends of a repair-reconstruction continuum.³⁷ Since these early decisions, U.S. courts have had to try to place all subsequent cases somewhere on this continuum and decide which actions constitute "repair" and which constitute "reconstruction."³⁸ Most cases involving a permissible repair defense do not involve a complete remaking of the destroyed patented article, as was the situation in *Cotton-Tie Co.*³⁹ If that were true, the determination of "repair" or "reconstruction" would be rather straightforward.⁴⁰ Most cases involving permissible repair more closely resemble the circumstances in *Wilson v. Simpson*, where one element or group of elements of a patented "combination" has been replaced or repaired.⁴¹ The court must then decide if the modifications made to the article are substantial enough to constitute reconstruction.⁴² The case that laid much of the foundation for modern day repair-reconstruction jurisprudence was in 1961 when the U.S. Supreme Court decided *Aro Manufacturing Company v. Convertible Top Replacement Company*.⁴³

³⁴ *Id.*

³⁵ *Id.* at 93.

³⁶ *Id.* at 94.

³⁷ Compare *Wilson v. Simpson*, 50 U.S. 109 (1850), with *Cotton-Tie Co. v. Simmons*, 106 U.S. 89 (1882). Perhaps this point was most clearly articulated by the Court of Appeals for the Federal Circuit in *Jazz Photo Corporation v. International Trade Commission* when it stated, "While the ownership of a patented article does not include the right to make a substantially new article, it does include the right to preserve the useful life of the original article. It is readily apparent that there is a continuum between these concepts; precedent demonstrates that litigated cases rarely reside at the poles wherein 'repair' is readily distinguished from 'reconstruction.'" 264 F.3d 1094, 1102 (Fed. Cir. 2001).

³⁸ See 6 R. CARL MOY, *MOY'S WALKER ON PATENTS* § 19:42 (4th ed. 2010) ("Cases in this area. . . routinely struggle with the question of whether the particular set of acts at issue constitutes a repair or a reconstruction. . . [W]hile the two activities can be distinguished conceptually, in actual practice, the fact patterns in which they arise differ only in degree, with no clear line to divide them.").

³⁹ See *id.* See also *Jazz Photo Corp. v. Int'l Trade Comm'n*, 264 F.3d 1094, 1102 (Fed. Cir. 2001). As discussed in footnote 37, the facts of these cases do not typically place the activity in question at one extreme or the other of the repair-reconstruction continuum.

⁴⁰ MOY, *supra* note 38, at § 19:42 ("[T]he simultaneous replacement or rebuilding of most of the substantial parts of the assembly is very likely to be a reconstruction.").

⁴¹ See discussion of caselaw *infra* Part III.

⁴² *Id.*

⁴³ 365 U.S. 336 (1961).

2. The Beginning of Modern-Day Jurisprudence: "Aro"⁴⁴

In 1956 Convertible Top Replacement Company acquired the patent rights for U.S. patent 2,569,724 ("patent '724"), "Convertible Folding Top with Automatic Seal at Rear Quarter."⁴⁵ The patent was directed toward a fabric top for a convertible automobile, including the underlying structural frame and sealing mechanism.⁴⁶ Upon acquiring patent '724, Convertible Top filed an action against Aro claiming direct and contributory infringement based on Aro's manufacture and sale of replacement fabric for the convertible top covered by patent '724.⁴⁷ The Court reversed the lower court's finding of infringement.⁴⁸

With respect to direct infringement, the Court offered the following rationale for its decision:

The fabric with which we deal here is an *unpatented element* of respondent's combination patent, which covers only the combination of certain components, one of which is a 'flexible top material.' The patent makes no claim to invention based on the fabric or on its shape, pattern or design. Whether the fabric or its shape might have been patentable is immaterial, for the fact is that neither the fabric nor its shape has been patented

It follows that petitioners' *manufacture and sale* of the fabric is not a *direct infringement* under 35 U.S.C. § 271(a).⁴⁹

The Court first acknowledged that contributory infringement can only be found if there is an underlying, directly infringing act.⁵⁰ Here, that would mean the Court finding that the purchaser of the replacement fabric directly infringed patent '724 before Aro could be held liable for contributory infringement.⁵¹ The Court rejected the lower court's holding of infringing

⁴⁴ A second case involving the same parties, *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476 (1964) was decided by the Supreme Court in 1964. The 1964 case was focused on the issue of contributory infringement as it applied to the same facts as the 1961 case. The 1961 case is often referred to as "Aro I" and the 1964 case as "Aro II." For the purposes of this note, the 1961 case will be referred to simply as "Aro."

⁴⁵ Aro, 365 U.S. 336 at 337.

⁴⁶ *Id.*

⁴⁷ *Id.* at 337-38.

⁴⁸ *Id.* at 346.

⁴⁹ *Id.* at 339-40 (emphasis added).

⁵⁰ *Id.* at 341.

⁵¹ *Id.*

reconstruction.⁵² Instead, the Supreme Court stated "that maintenance of the 'use of the whole' of the patented combination through replacement of a spent, unpatented element does not constitute reconstruction," reserving "reconstruction" to describe only "such a true reconstruction of the entity as to in fact make a new article, after the entity, viewed as a whole, has become spent."⁵³ The Court in *Aro* held the replacement of the fabric as a permissive repair.⁵⁴

Perhaps no message is clearer in the *Aro* decision than the determination that the patent rights afforded to an invention comprised of a combination of individual elements do not extend to the individual elements themselves.⁵⁵ The Court in *Aro* did suggest, however, that there is a limit to how much repair can be performed on a combination of unpatented elements before the combination would be deemed "reconstructed."⁵⁶ What is not clear from the *Aro* decision is how this limit is defined.⁵⁷ Since *Aro*, courts at every level have been trying to discern the extent of repair that can be performed before a permissible repair constitutes impermissible reconstruction.⁵⁸

B. Theories for Right to Repair

Parties who have been accused of an infringing "reconstruction" typically proffer one of two rationales for the right to repair: implied license or "patent exhaustion."⁵⁹ An implied license theory is framed around the idea that a patent owner licenses certain rights to the purchaser of a patented article, including the right to repair.⁶⁰ The article carries with it an implied

⁵² *Id.* at 344.

⁵³ *Id.* at 345–46 (internal citations omitted).

⁵⁴ *Id.* at 346.

⁵⁵ *Id.* at 345.

⁵⁶ *Id.* at 346.

⁵⁷ *See id.*

⁵⁸ *See, e.g.,* ERBE Elektromedizin GmbH v. Canady Tech. LLC, 529 F. Supp. 2d 577 (W.D. Pa. 2007); Fuji Photo Film Co. v. Jazz Photo Corp., 249 F. Supp. 2d (D.N.J. 2003); Rohm & Hass Co. v. Dawson Chemical Co., 599 F.2d 685 (5th Cir. 1979).

⁵⁹ *See* Amber Hatfield Rovner, *Practical Guide to Application of (or Defense Against) Product-Based Infringement Immunities Under the Doctrines of Patent Exhaustion and Implied License*, 12 TEX. INTEL. PROP. L.J. 227, 228 (2004) ("Product-based infringement immunities are typically invoked through the application of two doctrines: patent exhaustion . . . and implied license.").

⁶⁰ *See* Bottom Line Mgmt. v. Pan Man Inc., 228 F.3d 1352, 1354 (Fed. Cir. 2000) ("Unless the parties provide otherwise, the purchaser of a patented article has an implied license not only to use and sell it, but also to repair it to enable it to function properly."); Aktiebolag v. E.J. Co., 121 F.3d 669, 672 (Fed. Cir. 1997) (stating that the sale of a patented drill to a purchaser granted the purchaser "an implied license to use the drill for its useful life," and that "the implied license to use includes the right to repair the patented drill"). *See generally* Rovner, *supra* note 59, at 271.

license as it is conveyed to subsequent owners.⁶¹ The right to reconstruct the patented article, however, is generally understood to rest outside the scope of the implied license.⁶²

The other justification for a consumer's "right to repair" is the doctrine of patent exhaustion. The Federal Circuit has explained the idea, often termed the "first sale" doctrine, in the context of repair versus reconstruction:

Underlying the repair/reconstruction dichotomy is the principle of exhaustion of the patent right. The unrestricted sale of a patented article, by or with the authority of the patentee, 'exhausts' the patentee's right to control further sale and use of that article by enforcing the patent under which it was first sold.⁶³

The court then went on to clarify that "the product may not be the vehicle for a second creation of the patented entity . . . for such re-creation exceeds the rights that accompanied the initial sale."⁶⁴ Thus, the patent owner maintains the exclusive right to manufacture the patented article; the consumer "right to repair" stems from the purchaser's "right to use" the patented article.⁶⁵

While courts have at times referred to one or both of these doctrines, patent exhaustion has been the theory that has shaped the repair-reconstruction jurisprudence.⁶⁶ Even in instances when courts have claimed to apply an implied license regime to resolve a repair-reconstruction issue, it is often clear from the language and context of the analysis that the court is actually viewing the issue through the lens of patent exhaustion.⁶⁷ The same

⁶¹ Bottom Line Mgmt., 228 F.3d at 1354.

⁶² *Id.* at 1355. See also MOY, *supra* note 38, at § 19:42 ("[A] license to repair is . . . to be contrasted with a permission to make the patented invention generally. . . Reconstruction is considered to be an infringement of the patent owner's right to control making.") (internal citation omitted).

⁶³ *Jazz Photo Corp. v. ITC*, 264 F.3d 1094, 1105 (Fed. Cir. 2001). See also *United States v. Univis Lens Co.*, 316 U.S. 241, 250 (1942) ("[S]ale of [the patented article] exhausts the monopoly in that article and the patentee may not thereafter, by virtue of his patent, control the use or disposition of the article.").

⁶⁴ *Jazz Photo Corp.*, 264 F.3d at 1105.

⁶⁵ *Wilson v. Simpson*, 50 U.S. 109, 123 (1850) ("It is the use of the whole of that which a purchaser buys, when the patentee sells to him a machine; and when he repairs the damages which may be done to it, it is no more than the exercise of that right of care which every one may use to give duration to that which he owns, or has a right to use as a whole.").

⁶⁶ See Mark D. Janis, *A Tale of the Apocryphal Axe: Repair, Reconstruction, and the Implied License in Intellectual Property Law*, 58 MD. L. REV. 423, 427 (1999) (stating that the "exhaustion doctrine serves as [the] organizing principle" of the "repair-reconstruction dichotomy").

⁶⁷ See *id.* at 495 ("In most, if not all, of these cases, the courts employed the implied license more as a convenient label than as a serious analytical tool, and there is no dramatic distinction between these cases and those employing the model of exhaustion."); see also MOY, *supra* note 38, at § 19:33 ("The close connection between the two doctrines, and the confusion over their differences, is illustrated by various authorities that refer to them simultaneously. Some court decisions even appear to use the two terms, implied license and exhaustion, interchangeably.") (internal citations omitted).

outcome should be reached whether a case is decided on the theory of patent exhaustion or implied license, because in both cases the burden on the patentee is to show that the actions of the alleged infringer impeded the patentee's right to exclude others from making the patented article.⁶⁸

Supporters of an implied license regime have noted that licensing agreements allow for the expectations of the parties to be taken into account.⁶⁹ This suggests that an implied license theory may allow the patentee to restrict the consumer's right to repair by adding express terms to purchase agreements.⁷⁰ Such a restriction was upheld by the Federal Circuit in *Mallinckrodt, Inc. v. Medipart, Inc.* in 1992.⁷¹ The Court held that a customer who disobeyed the single use restriction on a patented product was liable for infringement.⁷² In effect, so long as a restriction did not violate antitrust or other laws, the ruling in *Mallinckrodt* allowed patent holders going forward to use post-sale restrictions to maintain a certain level of control over the use of patented articles.⁷³ A series of lower court cases addressing use restrictions was decided in the years that followed *Mallinckrodt*.⁷⁴ Generally, as long as a restriction was made known to the purchaser before or at the time of purchase, the restriction could overcome an implied license defense.⁷⁵

However, in 2017 the Supreme Court held in *Impression Products v. Lexmark International, Inc.* that, while restrictions in sales contracts or licensing agreements may be enforceable under contract law in state court,

⁶⁸ See generally MOY, *supra* note 38, at § 19:33 (distinguishing the theory of implied license versus the theory of patent exhaustion); see also *id.* at § 19:42 (describing the owner's right to repair as "a limited intrusion into the [patentee's] normal right to exclude others from making").

⁶⁹ See Janis, *supra* note 66, at 522 ("[T]he implied license model . . . gives enhanced importance to the parties' expectations.").

⁷⁰ See *id.* at 527 n.556 (explaining that restrictions on an implied license can serve as evidence of the patentee's intentions when evaluating the expectations of the parties); Rovner, *supra* note 59 at 243–45 (discussing the restriction of repair rights through license agreements). See also Orange, *supra* note 22 at 159 (indicating that patent owners can condition sales with specific restrictions).

⁷¹ *Mallinckrodt, Inc. v. Medipart, Inc.*, 976 F.2d 700, 709 (Fed. Cir. 1992).

⁷² *Id.* ("If the sale of the [product] was validly conditioned under the applicable law such as the law governing sales and licenses, and if the restriction . . . was within the scope of the patent grant or otherwise justified, then violation of the restriction may be remedied by action for patent infringement.").

⁷³ Richard H. Stern, *Post-Sale Restrictions After Mallinckrodt—an Idea in Search of Definition*, 5 ALB. L.J. SCI. & TECH. 1, 7 (1994). Five years later, the Federal Circuit reaffirmed the "Mallinckrodt-doctrine" in *B. Braun Med., Inc. v. Abbott Labs*, 124 F.3d 1419, 1426 (Fed. Cir. 1997).

⁷⁴ See generally Rovner, *supra* note 59 at 239–43; Amber L. Hatfield, *Patent Exhaustion, Implied Licenses, and Have-Made Rights: Gold Mines or Mine Fields*, 2000 COMPUTER L. REV. & TECH. J. 1, 46–51 (2000).

⁷⁵ Hatfield, *supra* note 74, at 46.

such restrictions were not enforceable via patent infringement litigation.⁷⁶ Chief Justice Roberts opined,

So long as a licensee complies with the license when selling an item, the patentee has, in effect, authorized the sale. That licensee's sale is treated, for purposes of patent exhaustion, as if the patentee made the sale itself. The result: The sale exhausts the patentee's rights in that item Once a patentee decides to sell—whether on its own or through a licensee—that sale exhausts its patent rights, regardless of any postsale restrictions the patentee purports to impose, either directly or through a license.⁷⁷

Thus, the Court in *Lexmark* rejected the rationale used in earlier lower court decisions and foreclosed the practice of patentees relying on patent law to enforce licensing or sales restrictions against purchasers.⁷⁸

Any benefit of employing implied license theory instead of patent exhaustion doctrine to resolve permissible repair disputes seems to have been lost in *Lexmark*, as the Court indicated that contract law, not patent law, should be used to enforce the expectations of the parties.⁷⁹ The only limitation on implied ownership rights that exists under current patent law jurisprudence stems from one patentee right that is not fully exhausted by a sale—that is, the right to exclude others from making the patented article.⁸⁰ An owner's right to repair has been described as a tolerated but "limited intrusion" upon the patentee's right to exclude others from making.⁸¹ It seems appropriate, then, to frame the discussion of infringing reconstruction around the following question regarding the patentee's right to exclude others from making: To what extent is the patentee's right to exclude exhausted upon sale? Or, conversely stated, what is the scope of the purchaser's right to repair in light of the patentee's partial exhaustion of the right to exclude?

⁷⁶ *Impression Prods. v. Lexmark Int'l, Inc.*, 137 S. Ct. 1523, 1534–35 (2017) ("A patentee's authority to limit licensees does not . . . mean that patentees can use licenses to impose post-sale restrictions on purchasers that are enforceable through the patent laws.").

⁷⁷ *Id.* at 1535.

⁷⁸ *See id.* at 1532, 1535. The holding in *Lexmark* does not preclude a patentee from making a claim of impermissible repair by challenging the authenticity of the transaction itself. *Id.* at 1535 (recognizing a patentee's right to sue for infringement if a sale is made outside of the scope of the license).

⁷⁹ *Id.* at 1535, 1538 ("Exhaustion does not arise because of the parties' expectations about how sales transfer patent rights. More is at stake when it comes to patents than simply the dealings between the parties, which can be addressed through contract law.").

⁸⁰ *See, e.g., Jazz Photo Corp. v. ITC*, 264 F.3d 1094, 1102 (Fed. Cir. 2001) ("The purchaser of a patented article has the rights of any owner of personal property, including the right to use it, repair it, modify it, discard it, or resell it[.] . . . However, the rights of ownership do not include the right to construct an essentially new article . . . for the right to make the article remains with the patentee.").

⁸¹ *See MOY, supra* note 38, at § 19:42 (detailing "a limited intrusion into the [patentee's] normal right to exclude others from making").

This Note will focus on the theory of patent exhaustion and how this doctrine can be applied to determine if a process should be deemed permissible repair or infringing reconstruction.

III. ANALYSIS OF POST-*ARO* JURISPRUDENCE

The decision in *Aro* was met immediately with harsh criticism⁸² and has continued to be denounced for its lack of clarity.⁸³ While the *Aro* Court suggested that there is an upper limit to what can be considered permissible repair, it decidedly turned away from applying any set of factors in determining whether "reconstruction" had taken place.⁸⁴ Instead, the Court in *Aro* stated that reconstruction "is limited to such a true reconstruction of the entity as to in fact make a new article"⁸⁵ and held that only if the patented "entity, viewed as a whole," was "spent" and then recreated would a finding of reconstruction be appropriate.⁸⁶ As Bernard Chao pointed out, the Court's explanation of what constitutes reconstruction is not only "unhelpful," but "tautological"—it "simply recharacterizes the term using words that sound just like the original term."⁸⁷

There are four major areas of ambiguity in the *Aro* holding.⁸⁸ First, the Court did not address whether a "reconstruction" must occur all at once or if

⁸² See, e.g., Edmund J. Sease, *Patent Law: Repair-Reconstruction a Review, Analysis, and Proposal*, 20 DRAKE L. REV. 85, 95 (1970) (noting that after *Aro* "the ire of the Patent Bar had been raised, and the vindictive assault began"); Janis, *supra* note 66, at 448 n.102 (noting that "a great deal of . . . literature criticized the Court's opinion").

⁸³ Bernard Chao, *Breaking Aro's Commandment: Recognizing That Inventions Have Heart*, 20 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 1183, 1205 (2010); Janis, *supra* note 66, at 443–48; Arthur J. Garjarsa et al., *How Much Fuel to Add to the Fire of Genius? Some Questions About the Repair/Reconstruction Distinction in Patent Law*, 48 AM. U.L. REV. 1205, 1221 (1999) (explaining that Justice Gajarsa of the U.S. Court of Appeals for the Federal Circuit raised the question as to whether the Supreme Court in *Aro* provided any real guidance or simply a "we know a reconstruction when we see it" test).

⁸⁴ *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 345 (1961). Prior to *Aro*, lower courts evaluated a number of factors, synthesized from the holdings of early repair-reconstruction Supreme Court cases, to determine whether a repair was permissible or infringing. See Sease, *supra* note 82, 86–92. Courts in the pre-*Aro* era considered the following when the legality of a repair process was at issue: (1) cost of part replaced relative to the cost of the entire patented device; (2) temporariness of part or parts replaced relative to the expected life of the patented device; (3) importance of the replaced part to the inventive concept; (4) difficulty or ease of making the replacement; (5) physical domination of the parts replaced relative to the remaining parts of the patented device; and (6) intention of the inventor. *Id.* at 91 (quoting Stuart Lubitz, Case Note, *Patents-Infringements Under 35 U.S.C. § 271(a)—Repair and Construction*, 29 GEO. WASH. L. REV. 952, 955 (1961)).

⁸⁵ *Aro*, 365 U.S. at 346.

⁸⁶ *Id.*

⁸⁷ Chao, *supra* note 83, at 1205.

⁸⁸ See generally *Aro*, 365 U.S. 336.

a series of repairs over time can also amount to infringement.⁸⁹ Second, while the Court used the term “spent” on multiple occasions in the *Aro* decision, it did not elaborate on the meaning of the term.⁹⁰ Third and fourth, the Court likewise did not provide meaningful context for the terms “separately patented” and “element.”⁹¹ Not surprisingly, much of the jurisprudence in the area of patent exhaustion as it applies to repair versus reconstruction is centered upon one or more of these four areas.⁹²

A. Replacement of Multiple Parts Over Time

The variable of the timespan over which permissible repairs can occur adds a layer of confusion to the already complex repair-reconstruction debate.⁹³ Several decades after *Aro*, the Federal Circuit held that extensive repairs to a patented product can exceed the limitations of what is permissible if the repairs occur in a single instance.⁹⁴ Yet, both the Federal Circuit and Supreme Court have held that the sequential replacement of parts over time is permissible.⁹⁵

In *FMC Corp. v. Up-Right, Inc.*, FMC held a patent directed toward a harvesting apparatus, including the “picking head.”⁹⁶ Up-Right sold harvesters, picking heads, and replacement parts for both.⁹⁷ FMC also sold replacement picking heads and claimed that Up-Right contributorily infringed the harvester patent by selling replacement parts, and that Up-Right customers directly infringed by using the Up-Right replacement parts.⁹⁸ FMC argued that, although no one single repair constituted “reconstruction,” over time most of the elements in the claimed combination were replaced and this constituted reconstruction.⁹⁹ The Federal Circuit Court disagreed, holding

⁸⁹ See *id.* at 346.

⁹⁰ *Id.* at 338, 339, 342, 346.

⁹¹ See *id.* at 345.

⁹² One other area of controversy has been modifications of patented articles. These situations, the court notes, are treated as being “kin to repair.” A modern case is *Surfco Hawaii v. Fin Control Systems Pty. Ltd.*, 264 F.3d 1062 (Fed. Cir. 2001) in which the Federal Circuit stated that “[p]recedent amply supports the right of a purchaser of a patented device to do more than simply replace spent or broken parts.” *Id.* at 1066. Hence, permissible repair covers not just the replacement of worn or broken parts, but also improvements or modifications to patented articles. *Id.*

⁹³ See *Husky Injection Molding Sys. v. R&D Tool & Eng’g Co.*, 291 F.3d 780 (Fed. Cir. 2002).

⁹⁴ *Id.* at 786–87.

⁹⁵ *Id.* at 786. See also *Aro*, 365 U.S. at 346; *FMC Corp. v. Up-Right, Inc.*, 21 F.3d 1073, 1077 (Fed. Cir. 1994). For an example at the district court level, see *Devon Distrib. Corp. v. Arthur E. Miner & A.J. Garrett & Assocs.*, 331 F. Supp. 2d 791, 794–95 (S.D. Iowa 2004).

⁹⁶ *FMC Corp.*, 21 F.3d 1073 at 1075.

⁹⁷ *Id.*

⁹⁸ *Id.* at 1075–76.

⁹⁹ *Id.* at 1077.

that "[m]ere 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."¹⁰⁰

The holding in *Aro* dictated that courts ignore the aggregate effect of successive repairs or replacements of parts over time.¹⁰¹ However, the district court explicitly addressed the conundrum—prior to the Federal Circuit's review of *FMC*—when it stated,

A literal reading of this rule in extreme cases, of course, would permit indefinite extension of the life of a patented item simply by the ruse of replacing one half of its parts one day, and the other half the next.¹⁰²

The Federal Circuit in *FMC* refused to provide a bright-line test to determine how much sequential replacement would be too much under the doctrine of permissible repair.¹⁰³ Instead, the court stated that such questions should be determined on a case-by-case basis by the "exercise of common sense and an intelligent judgment."¹⁰⁴

To illustrate the problem that can result from the lack of a workable standard in cases of sequential repair, the district court in *FMC* referred to an "apocryphal axe," of which the owner brags: "This is my great-grandfather's original axe, although the handle has been replaced five times, and the head twice."¹⁰⁵ The point being, of course, at what point is the axe no longer the original, but rather a recreation? In his criticism of the Federal Circuit's failure to provide a standard in *FMC*, Mark Janis adopted the district court's "apocryphal axe" and predicted that, until the Federal Circuit provided an answer to this "riddle," decisions centered upon questions of sequential repair would continue to be plagued by uncertainty.¹⁰⁶

The Federal Circuit's decision in *Husky Injection Molding Systems v. R&D Tool & Engineering Co.* finally offered clarity on the issue, stating in dicta that "[e]ven if the owner sequentially replaces all of the worn-out parts of a patented combination, this sequential replacement does not constitute

¹⁰⁰ *Id.* (quoting *Aro*, 365 U.S. at 346).

¹⁰¹ *Aro*, 365 U.S. 336, 346 (1961).

¹⁰² *FMC Corp. v. Up-Right, Inc.*, 816 F. Supp. 1455, 1464 (N.D. Cal. 1993).

¹⁰³ *FMC Corp. v. Up-Right, Inc.*, 21 F.3d 1073, 1078–79 (Fed. Cir. 1994).

¹⁰⁴ *Id.* at 1079 (quoting *Goodyear Shoe Mach. Co. v. Jackson*, 112 F. 146, 150 (1st Cir. 1901)).

¹⁰⁵ *FMC Corp. v. Up-Right, Inc.*, 816 F. Supp. 1455, 1464 n.15 (N.D. Cal. 1993); *See Janis, supra* note 66, at 485.

¹⁰⁶ *See Janis, supra* note 66, at 485 ("It should be evident that the riddle of the apocryphal axe will inevitably arise in sequential replacement cases like *FMC*, so long as the analysis revolves around spentness notions.").

reconstruction."¹⁰⁷ The Federal Circuit has not spoken on the issue of sequential repair since *Husky*; however, it seems highly probable that an infringement case built on a theory of reconstruction consisting of a series of repairs or replacements will not be supported by the current jurisprudence.¹⁰⁸

B. "Spentness"

According to *Aro*, the clearest case of infringing reconstruction would occur when a patented item is completely "spent" and then rebuilt as a "second creation."¹⁰⁹ Of course, most cases dealing with repair and reconstruction do not consist of cut-and-dry instances of a patented article being destroyed and rebuilt.¹¹⁰ In almost all cases, courts have to use much more discretion to determine whether a patented article, as a whole, has in fact been "spent."¹¹¹ Generally, courts tend to set a high bar for what constitutes a sufficiently worn article.¹¹² As first articulated in *Wilson v. Simpson*, "[w]hen the wearing or injury is partial, then repair is restoration, and not reconstruction"; only when "the material of the combination ceases to exist" will the reconstruction of a patented article be considered an infringement.¹¹³

The Supreme Court in *Wilbur-Ellis Co. v. Kuther* gave some insight into the level of wear necessary for a patent owner to be able to assert a claim of impermissible reconstruction using this line of reasoning.¹¹⁴ In *Wilbur-Ellis*, Kuther was the owner of a patent covering a fish-canning machine.¹¹⁵ Some of these machines were left abandoned in a plant in 1952.¹¹⁶ The machines, having been "unused, untended, exposed to rain and salt air, corroded and

¹⁰⁷ *Husky Injection Molding Sys. Ltd. v. R&D Tool & Eng'g Co.*, 291 F.3d 780, 786 (Fed. Cir. 2002).

¹⁰⁸ See generally Chao, *supra* note 83, at 1206-07 (discussing how narrowly the reconstruction standard for sequential repairs has been interpreted).

¹⁰⁹ See *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 346 (1961) ("The decisions of this Court require the conclusion that reconstruction of a patented entity, comprised of unpatented elements, is limited to such a true reconstruction of the entity . . . after the entity, viewed as a whole, has become spent. In order to call the monopoly, conferred by the patent grant, into play for a second time, it must, indeed, be a second creation of the patented entity.").

¹¹⁰ See, e.g., *Jazz Photo Corp. v. Int'l Trade Comm'n*, 264 F.3d 1094, 1102 (Fed. Cir. 2001) ("[P]recedent demonstrates that litigated cases rarely reside at the poles wherein 'repair' is readily distinguished from 'reconstruction.'").

¹¹¹ See, e.g., *Aro*, 365 U.S. at 343-46 (discussing the "spentness" standard); *Husky*, 291 F.3d 785-87 (discussing the role of "spentness" in three basic classifications of repair-reconstruction cases).

¹¹² See, e.g., *Wilson v. Simpson*, 50 U.S. 109, 123 (1850) (discussed *infra*); *Wilbur-Ellis Co. v. Kuther*, 377 U.S. 422, 424 (1964) (discussed *infra*).

¹¹³ *Wilson*, 50 U.S. at 123.

¹¹⁴ *Wilbur-Ellis Co.*, 377 U.S. 422.

¹¹⁵ *Id.* at 422.

¹¹⁶ *Kuther v. Leuschner*, 200 F. Supp. 841, 844 (N.D. Cal. 1961).

frozen solid to the extent that they were inoperable," were regarded as "junk" when Wilbur-Ellis purchased the machines second-hand in 1958.¹¹⁷ In order to restore the machines to working condition, Wilbur-Ellis had to sandblast and clean each of the machines and, with one of the machines, had to grind down and resize some of the canning elements because they were so corroded.¹¹⁸ Still, the Court held that these machines "were not spent; they had years of usefulness remaining though they needed cleaning and repair."¹¹⁹

Even in cases where the patented article has clearly been disassembled and rebuilt, courts have not always held the activity as infringing, as shown in *Dana Corp. v. Am. Precision Co.*¹²⁰ Dana was the owner of several patents on truck clutches.¹²¹ Dana and American Precision both distributed unpatented parts of the clutches to "production rebuilders" who took apart salvaged worn clutches and rebuilt refurbished clutches from other parts—both new and used.¹²² Dana claimed that because the "production rebuilder" working with American Precision, a rebuilder known as Century Parts, Inc., was sometimes rebuilding a patented Dana clutch with parts provided by American Precision instead of from Dana directly, that Century directly infringed and American Precision contributorily infringed Dana's patents.¹²³ Century asserted a permissible repair defense.¹²⁴ Dana contended that, by the act of disassembling the worn salvaged clutches, the clutches became sufficiently "spent" to meet the standard set in *Wilson v. Simpson* and that the reassembly of the clutches with a combination of new and used parts was, therefore, an infringing reconstruction of the patented clutch.¹²⁵ The lower court held, and the Federal Circuit affirmed, that the rebuilt clutches did not infringe upon the rights of Dana's patents.¹²⁶

The majority of cases in the decades that followed *Aro* focused heavily on the idea of "spentsness."¹²⁷ To avoid confronting the ambiguity of the *Aro* rule, courts generally hold as permissible all repairs short of complete,

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ *Wilbur-Ellis Co.*, 377 U.S. at 424.

¹²⁰ *Dana Corp. v. Am. Precision Co.*, 827 F.2d 755 (Fed. Cir. 1987).

¹²¹ *Id.* at 756.

¹²² *Id.* at 756-57.

¹²³ *Id.* at 757.

¹²⁴ *Id.*

¹²⁵ *Id.* at 759.

¹²⁶ *Id.* at 760. This holding reiterated the holding from a similar case decided about a decade earlier, *General Electric Co. v. United States*, 572 F.2d 745, 786 (Ct. Cl. 1978).

¹²⁷ See Janis, *supra* note 66, at 427 ("The exhaustion doctrine has driven courts to frame the repair-reconstruction distinction as an exercise in distinguishing permissible 'using' from impermissible new 'making.' Although the analyses vary widely, the general approach falls under the concept of spentsness.")

simultaneous replacement of every non-patented element.¹²⁸ There are, however, a few exceptions, and in the years since *Aro* several different tests have been employed by the lower courts as well as the Federal Circuit.¹²⁹ In addition, other analytical frameworks have been suggested in law review publications.¹³⁰

1. Proportionality/Cost of Repair

In 1935, the Sixth Circuit factored proportionality into its decision in *Automotive Parts Co. v. Wisconsin Axle Co.*, declaring,

[I]f new parts so dominate the structural substance of the whole as to justify the conclusion that it has been made anew, there is a rebuilding or reconstruction; and conversely, where the original parts, after re-placement, are so large a part of the whole structural substance as to preponderate over the new, there has not been a reconstruction but only repair.¹³¹

While the majority in *Aro* rejected the application of a set of factors to repair-reconstruction cases, in his concurring opinion Justice Brennan cited to *Automotive Parts Co.* as an example of the type of test that he felt should be applied in these cases.¹³²

Despite the Supreme Court's unwillingness to embrace any kind of factor-based analysis, the Federal Circuit has suggested that proportionality may be a significant factor to consider when deciding on the issue of "spontness."¹³³ For example, in the 2002 decision *Husky Injection Molding Sys. v. R&D Tool & Eng'g Co.*, the court stated,

[I]f a patent is obtained on an automobile, the replacement of the spark plugs would constitute permissible repair, but few would argue that the retention

¹²⁸ See Sease, *supra* note 82, at 102 ("[A] majority of the decisions have interpreted *Aro* I literally and have found that *Aro* I compels a finding of only permissible repair unless the defendant simultaneously replaces every component of the patented combination.").

¹²⁹ *Id.* at 102.

¹³⁰ See, e.g., Orange, *supra* note 22, at 134 (proposing that patent exhaustion should be treated as a motion to dismiss, "dispositive if successful, but otherwise the case continues forward to consider the remaining issues"); Janis, *supra* note 66 (advocating for an implied license framework); Chao, *supra* note 83 (advocating for a test that looks to the "heart of the invention").

¹³¹ *Automotive Parts Co. v. Wisconsin Axle Co.*, 81 F.2d 125, 127 (6th Cir. 1935).

¹³² *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 364 (1961) (Brennan, J., concurring).

¹³³ *Husky Injection Molding Sys. v. R&D Tool & Eng'g Co.*, 291 F.3d 780, 786-87 (Fed. Cir. 2002). See also *Fuji Photo Film Co., Ltd. v. Int'l Trade Comm'n*, 474 F.3d 1281, 1296 (Fed. Cir. 2007) (stating that it was significant to the decision that "there is no contention here that the extent of the refurbishment is disproportionate to the overall value of the parts that were not replaced").

of the spark plugs and the replacement of the remainder of the car at a single stroke was permissible activity akin to repair. Thus, there may be some concept of proportionality inherent in the distinction between repair and reconstruction.¹³⁴

Since *Husky*, however, the Federal Circuit has only referenced the idea of proportionality in an unpublished opinion.¹³⁵

2. Heart of the Invention

Somewhat related to the idea of proportionality is what the Court in *Aro* referred to as the “gist” or “heart” of the invention.¹³⁶ The respondent in *Aro* argued that once the “‘essential’ or ‘distinguishing’ part of the patented combination . . . wears out or is otherwise spent, [any replacement of that element] constitutes infringing ‘reconstruction.’”¹³⁷ Thus, the suggestion was that if a certain set of components of a patented combination was deemed “spent,” to rebuild this set of components would be an infringement.¹³⁸ The Court unequivocally rejected this argument, stating “[t]he fact that an unpatented part of a combination patent may distinguish the invention does not draw to it the privileges of a patent.”¹³⁹ This ban on the so-called “heart of the invention” test is generally regarded as a widely accepted tenet of the repair-reconstruction doctrine.¹⁴⁰

However, at least one commentator has pointed out that the rule against the heart of the invention test may not be as rigid as it seems.¹⁴¹ In his publication *Breaking Aro’s Commandment: Recognizing That Inventions Have Heart*, Bernard Chao observes that the notion of a “gist” or “heart” is pervasive in other areas of patent law.¹⁴² Chao contends that a framework that incorporates the concept of the “heart of the invention” can and should be a useful tool for assessing questions of permissible repair.¹⁴³

¹³⁴ *Husky Injection Molding Sys.*, 291 F.3d at 786–87.

¹³⁵ *Canon, Inc. v. GCC Int’l, Ltd.*, 263 Fed. App’x. 57, 61 (Fed. Cir. 2008) (unpublished opinion).

¹³⁶ *Aro*, 365 U.S. at 345.

¹³⁷ *Id.* at 344 (emphasis added).

¹³⁸ *Id.*

¹³⁹ *Id.* at 345.

¹⁴⁰ See Chao, *supra* note 83, at 1191 (“The established view is that the issue has been settled for some time and the courts are not permitted to consider the heart of the invention in their analysis.”).

¹⁴¹ *Id.* at 1192.

¹⁴² *Id.* at 1192–97.

¹⁴³ *Id.* at 1214–15. Chao acknowledges that not all questions of permissible repair can be resolved this way, as not every patented invention has an identifiable “heart.” *Id.* at 1190.

a. “Substantial Embodiment”

The strongest support for Chao’s proposal comes from the 2008 Supreme Court case *Quanta Computer, Inc. v. LG Electronics, Inc.*¹⁴⁴ In *Quanta*, LG Electronics (“LGE”) was attempting to assert its patent rights against Quanta Computer Inc. (“Quanta”) and in response Quanta raised the affirmative defense of patent exhaustion.¹⁴⁵ The Supreme Court found that all of LGE’s patent rights were exhausted because it had sold, through a licensed vendor, components that “substantially embodied” its patented combination.¹⁴⁶

The Court’s willingness to declare that the rights of the patent owner are exhausted by sale of *less than the whole* of the combination seems incongruent with *Aro*’s holding that no set of “essential” components can constitute the combination as a whole.¹⁴⁷ This discrepancy was brought to the attention of the Court in *Quanta* and the Court responded as follows:

Aro’s warning that no element can be viewed as central to or equivalent to the invention is specific to the context in which the patented combination itself is the only inventive aspect of the patent.¹⁴⁸

The Court went on to say,

[M]aking a product that *substantially embodies* a patent is, for exhaustion purposes, no different from making the patented article itself. In other words, no further “making” results from the *addition of standard parts . . .* to a product that already substantially embodies the patent.¹⁴⁹

Thus, it seems that the Court is embracing a test that looks very similar to the “heart of the invention” for purposes of patent exhaustion but has not yet recognized such a test for questions of permissible repair.¹⁵⁰ Chao contends that, in light of *Quanta*, the heart of the invention test should be an element of the repair-reconstruction doctrine and that the Supreme Court needs to address the issue head-on.¹⁵¹

¹⁴⁴ *Quanta Computer, Inc. v. LG Elecs., Inc.*, 553 U.S. 617 (2008).

¹⁴⁵ *Id.* at 622–25.

¹⁴⁶ *Id.* at 633 (emphasis added).

¹⁴⁷ See Chao, *supra* note 83, at 1233.

¹⁴⁸ *Quanta*, 553 U.S. at 635. To determine if a given element is a “substantial embodiment” of the patented combination, the Court looked to several factors, including whether, based on the design of the element, it could only function in the combination and whether any “creative or inventive decision” was required to arrive at the combination. *Id.* at 633–34. See also Chao, *supra* note 83, at 1237.

¹⁴⁹ *Quanta*, 553 U.S. at 637 (emphasis added).

¹⁵⁰ See *id.*

¹⁵¹ Chao, *supra* note 83, at 1234, 1237–40. For another thorough discussion of the “substantial

C. "Separately Patented" Components

In *Aro*, the Supreme Court rejected the notion that certain components of a patented article could be more important, or "essential," than others *unless those components were themselves separately patented*.¹⁵² While not explicit, the implication of the holding in *Aro* is that the repair or replacement of a separately patented component may be inherently infringing.¹⁵³ This impression is further supported by a reading of Justice Harlan's dissenting opinion, which states,

[T]he Court holds that there can be no direct infringement . . . of a combination patent by replacement of any of the components of the patented entity unless (1) such component is itself separately patented or (2) the entire entity is rebuilt at one time.¹⁵⁴

The Federal Circuit in *Jazz Photo* also suggested that had the accused infringing party replaced a "separately patented" component of the disposable camera, the activity may have been held as a reconstruction rather than a repair.¹⁵⁵ However, while there are many examples of accused infringers successfully asserting the right to repair or replace *unpatented* components of a combination,¹⁵⁶ the caselaw—looking from the other

embodiment" test from *Quanta*, see Orange, *supra* note 22, at 134–35. Similarly, Mark Lemley has suggested that the court apply a "point of novelty test" to determine if a combination patent has been infringed upon. Mark A. Lemley, *Point of Novelty*, 105 NW. U.L. REV. 1253, 1259 (2011).

¹⁵² *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 346 (1961).

¹⁵³ See *Derrick Corp. v. Screen Logix, LLC*, No. 6:15-cv-01238, 2016 U.S. Dist. LEXIS 122036 at *5–*7 (W.D. La. 2016).

¹⁵⁴ *Id.* at *6 (quoting *Aro Mfg. Co.*, 365 U.S. at 370) (Harlan, J., dissenting)).

¹⁵⁵ *Jazz Photo Corp v. ITC*, 264 F.3d 1094, 1107 (Fed. Cir. 2001) (stating the lower court's ruling of reconstruction as to these patents is incorrect, because "the remanufacturing processes simply reuse the original components, such that there is no issue of replacing parts that were separately patented").

¹⁵⁶ See, e.g., *Husky Injection Molding Sys. v. R&D Tool & Eng'g Co.*, 291 F.3d 780, 786 (Fed. Cir. 2002) (reiterating the holding from *Aro*, "replacement of a spent part of a combination patent, which is not separately patented, is not impermissible reconstruction"); *Sage Prods. v. Devon Indus.*, 45 F.3d 1575, 1578 (Fed. Cir. 1995) ("[T]he doctrine of repair . . . encompasses any repair that is necessary for the maintenance of the use of the whole of the patented combination through replacement of a spent, unpatented element.") (internal citation and punctuation omitted); *Everpure, Inc. v. Cuno, Inc.*, 875 F.2d 300, 302–03 (Fed. Cir. 1989) ("The doctrine of permissible repair allows one lawfully using a patented combination to preserve and maintain the combination by making repairs or replacing unpatented component parts necessary for continued use."); *Dräger Med. GMBH v. Allied Healthcare Prods.*, No. 13-1656-SLR, 2015 U.S. LEXIS 38917, at *10 (D. Del. Mar. 27, 2015) ("The doctrine of repair encompasses any repair that is necessary for the maintenance of the use of the whole of the patented combination through replacement of a spent, unpatented element.") (internal citation and punctuation omitted); *Surgical Laser Techs., Inc. v. Surgical Laser Prods.*, No. 90-7965, 1992 U.S. Dist. LEXIS 14489, at *8 (E.D. Pa. Sept. 18, 1992) ("Repair can include replacing the product's unpatented component parts.").

direction—is scarce. There are very few cases in which the patent owner has been able to effectively argue that a *separately patented* component cannot be repaired or replaced.¹⁵⁷

The Supreme Court ruling in *Quanta*, however, seems to modify the “separately patented element” doctrine by allowing the purchaser of certain individually patented components of a combination to build the combined whole.¹⁵⁸ According to the *Quanta* holding, if a patented component is deemed to “substantially embody” the combination, it is not infringing for a party to add to that component and construct the combination in its entirety.¹⁵⁹ In other words, the Court leaves open the possibility that the purchase of a separately patented component can exhaust the patentee’s rights in not only that component, but also in the combination.

An even more complicated issue arises if a patent holder is trying to assert a claim that a component is separately patented independent of the combination patent.¹⁶⁰ The Federal Circuit in *Anton/Bauer, Inc. v. PAG, Ltd.* indicated that claiming a component “individually” in a patent may be satisfactory to show that the component is “separately patented.”¹⁶¹ However, as David Orange recently noted, since a patent only covers one invention, if “there are multiple types of claims in the patent . . . all rights are exhausted.”¹⁶²

Orange uses the case of *Stukenborg v. United States*¹⁶³ as an example of how, in light of *Quanta*, claims directed toward certain features of a combination are not separately protected for purposes of the repair-reconstruction doctrine.¹⁶⁴ In *Stukenborg*, the patentee held a patent for an improved turnbuckle assembly, known as the “Stukelock,” used to connect control cables for airplanes in a fashion that allowed the cable tension to be

¹⁵⁷ See, e.g., *Derrick Corp.* at *5–*7 (W.D. La. 2016). The Northern District of Illinois made note of the fact that no Supreme Court or Federal Circuit cases have addressed a challenge to a separately patented component and that “in cases where the patentee separately patented a replacement part of a combination patent, there is an open question when looking at district court cases.” *Id.* However, the court in *Derrick* held that, based on the context of *Aro* and from Justice Harlan’s interpretation of the majority holding, “if the new part is protected under separate patent . . . replacement infringes the combination patent because the purchaser engages in an unauthorized use of the combination by configuring it with an element that infringes another patent of the patent owner.” *Id.* See also *R2 Medical Systems, Inc. v. Katecho, Inc.*, 931 F. Supp. 1397, 1445–46 (N.D. Ill. 1996).

¹⁵⁸ See *Robert Bosch LLC v. Trico Prods. Corp.*, No. 12-C-437, 2014 U.S. Dist. LEXIS 69902 at *11–*16 (N.D. Ill. May 21, 2014) (addressing the defendant’s attempt to apply *Quanta* to the instant case).

¹⁵⁹ *Quanta Computer, Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 634 (2008).

¹⁶⁰ See *Anton/Bauer, Inc. v. PAG, Ltd.*, 329 F.3d 1343, 1352–53 (Fed. Cir. 2003).

¹⁶¹ *Id.*

¹⁶² Orange, *supra* note 22, at 144.

¹⁶³ *Stukenborg v. United States*, 372 F.2d 498 (Ct. Cl. 1967).

¹⁶⁴ Orange, *supra* note 22, at 157–59.

adjusted easily and quickly relative to other turnbuckle systems.¹⁶⁵ Claims one through four were directed to a lock clip and claims five through seven were directed toward a turnbuckle assembly (a combination comprised of the lock clip and other components).¹⁶⁶ The Department of Defense purchased all of the components necessary to build or repair the Stukelock turnbuckle assemblies, including lock clips.¹⁶⁷ The purchase of the lock clips was from an authorized source, while the purchase of the remaining components was not.¹⁶⁸ Stukenborg contended that the defendant infringed by combining the claimed lock clip with the components from the unauthorized source to arrive at the patented combination turnbuckle assembly.¹⁶⁹ The court in *Stukenborg* held that the authorized sale of the clips did not exhaust the patentee's rights in the Stukelock turnbuckle assembly and found that the defendant infringed the combination patent.¹⁷⁰

According to Orange, *Stukenborg* would be decided differently under the jurisprudence of *Quanta*.¹⁷¹ Because the lock clips in *Stukenborg* "substantially embodied" the combination and the remaining components were "standard parts," the sale of those clips would exhaust the patentee's rights in the combination turnbuckle assembly.¹⁷² Put differently, under *Quanta*, only the lock clip would be considered patented.¹⁷³ Upon purchase of the clip, the patentee would exhaust all rights to all claims in the turnbuckle assembly as a whole.¹⁷⁴ Thus, for purposes of the repair-reconstruction doctrine, there is no guarantee that a claim directed toward certain features of a patented combination will convey to those features "separate" patent protection.¹⁷⁵

¹⁶⁵ *Stukenborg*, 372 F.2d at 499–502.

¹⁶⁶ U.S. Patent No. 2,843,408 col. 4 l. 4–col. 6 l. 48 (filed June 27, 1956).

¹⁶⁷ *Stukenborg*, 372 F.2d at 503.

¹⁶⁸ *Id.*

¹⁶⁹ *Id.*

¹⁷⁰ *Id.* at 504. Orange also discusses a similar case, *Hunt v. Armour & Co.*, 185 F.2d 722 (7th Cir. 1950). The patent in *Hunt* was for a "plucking device" to remove feathers from a chicken. The device was comprised of a drum, a motor, and metal rods or "fingers." *Hunt*, 185 F.2d at 725–26. Certain claims were directed toward the combination ("device") and some toward the metal rods ("fingers"). *Id.* at 729. *Hunt* successfully argued that the defendant had infringed the combination patent by installing the claimed "fingers" on a device purchased from another vendor. *Id.* The court stated that the purchase of the "fingers" did not grant the defendant the right to construct the combination as a whole. *Id.*

¹⁷¹ Orange, *supra* note 22, at 157–58.

¹⁷² *Id.*

¹⁷³ *Id.*

¹⁷⁴ *Id.*

¹⁷⁵ *Id.*

D. "Elements": Readily Replaceable Parts

The holding in *Aro* and the jurisprudence since dictates that the replacement of an unpatented *element* (or *component*) is a permissible exercise of property rights.¹⁷⁶ Still, the *meaning* of terms like "element" and "component" as applied in *Aro* are unclear.¹⁷⁷ Depending on how these terms are defined, the repair or replacement of individual unpatented elements (or combinations thereof) may or may not be deemed impermissible reconstruction.¹⁷⁸

The Federal Circuit, in *Husky Injection Molding Systems v. R&D Tool Engineering Co.*, attempted to clarify what the Supreme Court in *Aro* intended by the use of the term "element," asserting that the *Aro* holding was restricted only to "replaceable parts."¹⁷⁹ The court further stated that *Aro* did not foreclose "inquiry into whether a particular part is replaceable" and held that "there is no infringement if the particular part is readily 'replaceable.'"¹⁸⁰ Thus, based on the Federal Circuit's interpretation of *Aro*, the classification of a part as "readily replaceable" will significantly impact the repair-reconstruction analysis.¹⁸¹

To determine whether a part is "readily replaceable," the Federal Circuit has, at times, looked to the *nature of the repair and the parts involved*, assessing factors like the durability of the replaced or repaired part relative to the patented article as a whole¹⁸² and the intent of the patentee in designing the patented article.¹⁸³ For example, the Federal Circuit in *Husky* ultimately decided that the inventor of an injection molding machine anticipated that the molds and carrier plates would need to be replaced from time to time and that

¹⁷⁶ See *Kendall Co. v. Progressive Medical Tech., Inc.*, 85 F.3d 1570, 1576 (Fed. Cir. 1996) (holding that customers had a "right to repair" a device for measuring blood pressure by replacing the pressure sleeves, as this did not constitute a reconstruction); *Sage Prods. v. Devon Indus.*, 45 F.3d 1575, 1579 (Fed. Cir. 1995) (holding that replacement of an inner container to a waste disposal system for sharps was a permissible repair); *Everpure, Inc. v. Cuno, Inc.*, 875 F.2d 300, 303 (Fed. Cir. 1989) (holding that replacement of a spent water filter cartridge with a third party cartridge was a permissible repair); *Dräger Med. GMBH v. Allied Healthcare Prods.*, 2015 U.S. LEXIS 38917, at *9-*10 (D. Del. Mar. 27, 2015) (holding that replacement of a spent canister from a carbon dioxide absorbing unit was a permissible repair).

¹⁷⁷ *Id.*

¹⁷⁸ *Id.*

¹⁷⁹ *Husky Injection Molding Sys. v. R&D Tool & Eng'g Co.*, 291 F.3d 780, 787 (Fed. Cir. 2002).

¹⁸⁰ *Id.*

¹⁸¹ *Id.*

¹⁸² *Wilson v. Simpson*, 50 U.S. 109, 125 (1850) (discussing that the owner of a patented machine should be able to replace parts of the machine that would wear out sooner than the machine as a whole).

¹⁸³ *Husky*, 291 F.3d at 788 (citing *Dana Corp v. Am. Precision Co.*, 827 F.2d 755, 759 (Fed. Cir. 1987)).

the design of the machine facilitated such replacements.¹⁸⁴ Therefore, a repair process comprised only of replacing molds and/or carrier plates was held as permissible and the seller of the replacement molds and carrier plates did not contributorily infringe.¹⁸⁵

1. *Aktiebolag v. E.J. Co.*

A rare example of a finding of impermissible reconstruction was in the Federal Circuit's 1997 decision *Aktiebolag v. E.J. Co.*¹⁸⁶ Here, the court held, "under the totality of the circumstances," that a repair process comprised only of replacing unpatented components was impermissible.¹⁸⁷ In *Aktiebolag*, a patented drill was "re-tipped" by the infringing party.¹⁸⁸ After determining that the drill was "spent" when the carbide tip could no longer be sharpened, the court then applied a four-pronged analysis to evaluate the re-tipping process.¹⁸⁹ The factors considered by the court were:

1. "the nature of the actions by the defendant,"
2. "whether one of the components of the patented combination has a shorter useful life than the whole,"
3. the "objective evidence of the intent of the patentee," and
4. "whether a market has developed to manufacture or service the part at issue."¹⁹⁰

The court held that the lifetime of the drill as a whole was expected to coincide with the lifetime of the drill tip.¹⁹¹ Further, because of the extreme conditions required to remove the old drill tip and the extensive steps involved in attaching the new tip, the tip was not designed to be a replaceable part.¹⁹² Finally, the court noted that no replacement carbide tips were ever made or sold by the patentee, which supports the notion that the tip was not intended to be replaceable.¹⁹³

¹⁸⁴ *Id.*

¹⁸⁵ *Id.*

¹⁸⁶ *Aktiebolag v. E.J. Co.*, 121 F.3d 669, 673 (Fed. Cir. 1997).

¹⁸⁷ *Id.*

¹⁸⁸ *Id.* at 671.

¹⁸⁹ *Id.* at 673.

¹⁹⁰ *Id.*

¹⁹¹ *Id.*

¹⁹² *Id.*

¹⁹³ *Id.*

a. Application of Aktiebolag by the Federal Circuit

Since it put forth the multi-part test in *Aktiebolag*, the Federal Circuit's employment of the test has been irregular.¹⁹⁴ In 2000, the court applied the test in *Bottom Line Mgmt. v. Pan Man, Inc.* to determine that the refurbishing of cooking surfaces constituted permissible repair.¹⁹⁵ Strangely, that same year, in *Jazz Photo Corp. v. ITC*, the Federal Circuit criticized findings of the International Trade Commission that were based on the framework from *Aktiebolag*.¹⁹⁶ The court in *Jazz Photo* stated that "[t]he Court has cautioned against reliance on any specific set of 'factors' in distinguishing permissible from prohibited activities."¹⁹⁷ Instead, the Federal Circuit held that the activity in question in *Jazz Photo* was permissible because the patented article being repaired still had sufficient "remaining useful capacity."¹⁹⁸ The Federal Circuit then referred to the *Aktiebolag* test again in *Husky* in 2002.¹⁹⁹ In sum, the application of the *Aktiebolag* test at the appellate level has varied since its introduction in 1997.²⁰⁰

b. Adoption of Aktiebolag at the District Level

Perhaps in response to the lack of clarity that followed *Aro*, district courts have been more willing to adopt the factors from *Aktiebolag* when deciding repair-reconstruction cases. In many of these cases courts have looked at the "totality of the circumstances" in conjunction with the *Aktiebolag* factors and have found permissible repair.²⁰¹ In *Soff-Cut International, Inc. v. N.E.D.*

¹⁹⁴ *Id.*

¹⁹⁵ *Bottom Line Mgmt. v. Pan Man, Inc.*, 228 F.3d 1352, 1355–56 (Fed. Cir. 2001).

¹⁹⁶ *Jazz Photo Corp. v. ITC*, 264 F.3d 1094, 1106 (Fed. Cir. 2001).

¹⁹⁷ *Id.*

¹⁹⁸ *Id.*

¹⁹⁹ *Husky Injection Molding Sys. v. R&D Tool & Eng'g Co.*, 291 F.3d 780, 788 (Fed. Cir. 2002).

²⁰⁰ See *Jazz Photo Corp.*, 264 F.3d at 1106; *Husky Injection Molding Sys.*, 291 F.3d at 788.

²⁰¹ See *Varex Imaging Corp. v. Richardson Elecs., Ltd.*, No. 18-CV-6911, 2019 U.S. Dist. LEXIS 144935, *7–*13 (N.D. Ill. Aug. 27, 2019) (finding X-ray tubes replaceable despite patentee's intent otherwise); *Robert Bosch LLC v. Trico Prods. Corp.*, No. 12-C-437, 2014 U.S. Dist. LEXIS 69902, *8–*9 (N.D. Ill. May 21, 2014) (holding that wiper blades were replaceable); *Process Controls Int'l, Inc. v. Emerson Process Mgmt.*, No. 4:10-CV-645, 2012 U.S. Dist. LEXIS 151243, *14–*16 (E.D. Mo. Oct. 22, 2012) (holding that repairs were permissible because the process controllers were found to have readily replaceable parts, a substantial market for the repaired products existed, and patentee intended for the controllers to be repaired in this manner, as patentee did these repairs as well); *Fargo Elecs., Inc. v. Iris Ltd., Inc.*, No. 04-1017, 2005 U.S. Dist. LEXIS 34493, *19–*20 (D. Minn. Nov. 30, 2005) (holding that a printer ribbon is a readily replaceable part); *United States Surgical Corp. v. Orris, Inc.*, 5 F. Supp. 2d 1201, 1208 (D. Ks. 1998). *But see BorgWarner, Inc. v. Dorman Prods.*, No. 09-11602, 2009 U.S. Dist. LEXIS 115871, *9–*10 (E.D. Mi. Dec. 11, 2009) (deeming the repair of an air pump impermissible because parts were considered not readily replaceable).

Corp. the Central District of California provided a thorough analysis of each *Aktiebolag* factor²⁰² and also took note of the Federal Circuit's decision not to employ the factors.²⁰³ The analysis put forth in *Soff-Cut* will be discussed in the following section.

i. *Soff-Cut Int'l, Inc.*

The case in *Soff-Cut* was centered upon whether the addition of a plastic shield to the "skid plate" of a patented saw constituted impermissible reconstruction.²⁰⁴ To make this determination, the court examined the four factors from *Aktiebolag* and the relevant caselaw related to each in detail.²⁰⁵ A summary of the court's discussion of each factor and how it applies to the facts of the case is given below.

a) Defendant's Conduct: Extent of Changes, Modification Rather than Replacement, Difficulty of Modification

Whether or not a defendant has impermissibly reconstructed "a patented product depends in large part on the extent of the change made to the article."²⁰⁶ For purposes of repair-reconstruction analysis, unless an added component *physically replaces* an original component of the patented article, it is irrelevant that the added component is *functionally equivalent* to the original component.²⁰⁷ So long as none of the original components of the patented article are *replaced or altered*, modifications to a patented article simply extend the life of the original article and do not amount to a reconstruction of the article.²⁰⁸ A more complicated repair process is more likely to be deemed an impermissible reconstruction than is a simple repair process.²⁰⁹

The court considered this to be the most important of all the factors and held that "the defendant's actions [in this case] were more like repair than reconstruction."²¹⁰ To support its conclusion, the court cited the following:

²⁰² *Soff-Cut Int'l, Inc. v. N.E.D. Corp.*, No. 03-2972, 2004 U.S. Dist. LEXIS 31158, *9-*26 (C.D. Ca. Apr. 6, 2004).

²⁰³ *Id.* at *9-*10. The court in *Soff-Cut* used the *Aktiebolag* factors as a means of assessing the "totality of the circumstances," using no one factor as determinative. *Id.*

²⁰⁴ *Id.* at *2.

²⁰⁵ *Id.* at *10-*26.

²⁰⁶ *Id.* at *10.

²⁰⁷ *Soff-Cut Int'l, Inc.*, 2004 U.S. Dist. LEXIS 31158 at *12-*13 (emphasis added).

²⁰⁸ *Id.* at *16-*17.

²⁰⁹ *Id.* at *17-*18.

²¹⁰ *Id.* at *26.

1. the bottom of the skid plate had not been physically replaced, just covered by the plastic shield to reduce wear²¹¹
2. the fact that the plastic shield replaced the function of the metal skid plate was irrelevant to this analysis²¹²
3. modifications that do not replace any existing element of the original article, but just prolong the lifetime of the article as a whole generally favor a finding of permissible repair²¹³
4. "adding the plastic shield [was] not an extensive or a difficult change to the skid plate"²¹⁴

b) Nature of the Device: Whether One Part Wears Faster than the Whole, Readily Separable Parts, and Whether the Part to be Replaced is Spent

The way in which a component is defined can change the outcome of this analysis.²¹⁵ If a component is comprised of several smaller *subcomponents*, the relative wear of each *subcomponent* must be referenced according to the component as a whole and to the patented article as a whole.²¹⁶ If any *subcomponent* has a significantly shorter lifespan than the component as a whole or than the patented article as a whole, replacement of the *whole component* is more likely to be considered permissible repair.²¹⁷ The replacement of a component comprised of *readily separable* subcomponents may weigh toward a finding of permissible repair, although even the replacement of a component comprised of a single unit can be deemed permissible.²¹⁸ While the status of a given component as "spent" generally does not have a significant effect on the repair-reconstruction decision, the replacement of an *unspent component* typically weighs in favor of a finding of repair.²¹⁹

With respect to this factor, the court held that "[t]he nature of the patented invention also weighs toward repair."²²⁰ For purposes of this analysis, the court considered the skid plate to consist of three subcomponents: the bottom support plate, a longitudinal slot, and a mounting portion "to secure the plate to the base of the saw."²²¹ The court then stated that, because the bottom

²¹¹ *Id.* at *12–*13.

²¹² *Id.* at *13.

²¹³ *Soff-Cut Int'l, Inc.*, 2004 U.S. Dist. LEXIS 31158 at *15.

²¹⁴ *Id.* at *26.

²¹⁵ *Id.* at *20.

²¹⁶ *Id.* at *20–*21.

²¹⁷ *Id.*

²¹⁸ *Id.* at *21–*22.

²¹⁹ *Soff-Cut Int'l, Inc.*, 2004 U.S. Dist. LEXIS 31158 at *23–*24.

²²⁰ *Id.* at *26.

²²¹ *Id.* at *20.

support plate and the slot wear faster than the mounting portion, "the skid plate as a whole has a longer life than the bottom support and the slot."²²² The court also noted that even though the skid plate is comprised of one solid piece of metal rather than "readily separable subcomponents," no portion of the skid plate was removed during the repair.²²³ The court stated that this distinguishes the case from *Aktiebolag*, in which portions of the solid metal drill bit were detached and refashioned.²²⁴ Finally, the court did not place much emphasis on the level of wear to the skid plate before the plastic shield is affixed, stating that, in view of the rest of the factors, "whether the plastic shield is designed for spent or unspent skid plates is not dispositive."²²⁵

c) Market for Repair

The existence of a market for replacement parts or repair service tends to weigh in favor of a finding of repair rather than reconstruction, as this is viewed as an indication of the shorter anticipated lifetime of certain components of the patented invention.²²⁶ However, because a market for replacement parts or repair service may not be able to develop if it has been prohibited by the patent holder, the lack of such a market is generally not an indicator of impermissible reconstruction.²²⁷

The court stated that, although the lack of the development of a market for repair weighs in favor of *Soff-Cut*, this did "not outweigh all the other factors pointing toward repair."²²⁸

d) Intent of Patentee

While an argument for permissible repair can be supported by evidence that a patentee intended certain components of a patented article to be replaced before the article as a whole was "spent," the presence or absence of patentee intent "does not convert the customers' actions into reconstruction."²²⁹

²²² *Id.* at *20-*21.

²²³ *Id.* at *21-*22.

²²⁴ *Id.*

²²⁵ *Soff-Cut Int'l, Inc.*, 2004 U.S. Dist. LEXIS 31158 at *24.

²²⁶ *Id.* at *24-*25.

²²⁷ *Id.* at *25.

²²⁸ *Id.* at *26.

²²⁹ *Id.* at *25-*26.

The court stated that even though *Soff-Cut* may not have intended for the skid plates to be replaced, this lack of intent was not dispositive in light of all the other factors.²³⁰

e) Summary

The application of the *Aktiebolag* factors by the court in *Soff-Cut* allowed the court to hold the following:

In order for NED to be guilty of infringement, its actions must constitute reconstruction of the skid plate rather than repair . . . [T]he totality of the circumstances shows that a customer who uses the plastic shield on the skid plate does not reconstruct a new skid plate but rather permissibly repairs the one she purchased.²³¹

The “totality of the circumstances” approach adopted from *Aktiebolag* in *Soff-Cut* has been employed on a few other occasions by the district courts²³² and by the Federal Circuit.²³³

IV. RESOLUTION: SYNTHESIS OF A NEW STANDARD FOR PERMISSIBLE REPAIR

In order for courts and practitioners to better navigate the repair-reconstruction doctrine, it is important to evaluate how the *Aro* “rule” has been interpreted and applied over nearly sixty years of jurisprudence. The post-*Aro* caselaw and commentary provide certain core tenets that can be synthesized to formulate a modern understanding of permissible repair.²³⁴ This Note proposes that the modern definition of “reconstruction” should include the principles discussed in the sections that follow.

A. The Right to Repair a Combination is Maintained by Ownership of the “Substantial Embodiment” of That Combination

The Supreme Court in *Quanta* held that, with respect to patent exhaustion, the purchase of an element that “substantially embodies” a

²³⁰ *Id.* at *25–*26.

²³¹ *Soff-Cut Int’l, Inc.*, 2004 U.S. Dist. LEXIS 31158 at *26–*27 (emphasis added).

²³² *See, e.g.*, *Varex Imaging Corp. v. Richardson Elecs., Ltd.*, No. 18-CV-6911, 2019 U.S. Dist. LEXIS 144935, *1, *9 (N.D. Ill. Aug. 27, 2019); *BorgWarner, Inc. v. Dorman Prods.*, No. 09-11602, 2009 U.S. Dist. LEXIS 115871, *1, *10 (E.D. Mich. Dec. 11, 2009).

²³³ *See, e.g.*, *Bottom Line Mgmt. v. Pan Man Inc.*, 228 F.3d 1352, 1355 (Fed. Cir. 2000).

²³⁴ *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336 (1961).

patented invention will exhaust the patentee's rights to the combination as a whole.²³⁵ In other words, the minimum amount of a patented invention that one must lawfully own to claim rights in the invention as a whole is the "substantial embodiment" of the invention. Another way of viewing this reasoning is that the consumer's right to use or sell a combination does not attach to anything less than the "substantial embodiment" of the combination. If the substantial embodiment of the combination fails or breaks, the resulting entity would be less than what is required to maintain the right to use, and hence right to repair, the combination.²³⁶

B. The "Substantial Embodiment" of a Patented Invention is Equal to the Invention as a Whole, Minus Any "Readily Replaceable Parts"

According to *Quanta*, an element is said to "substantially embody" a patented invention if the only distinction between the element and the invention as a whole is the addition of "standard parts."²³⁷ This idea seems consistent with the Federal Circuit's opinion in *Husky*, which held that certain parts could be deemed "readily replaceable" and that only the repair and/or replacement of such parts was permissible under *Aro*.²³⁸ Therefore, an appropriate way to define the "substantial embodiment" of a combination is by what is left after the removal of all "readily replaceable parts."

C. Readily Replaceable Parts Can be Determined by the Factors Provided by Aktiebolag and Expanded Upon in Soff-Cut.

The Federal Circuit in *Aktiebolag* laid out some basic factors for establishing whether a given activity constituted repair or reconstruction.²³⁹ The court in *Soff-Cut* provided an expansive analysis of each of these factors.²⁴⁰ By working through each of the considerations as outlined by *Soff-Cut*, one can make a determination as to whether a given activity involved the repair or replacement of "readily replaceable" parts.²⁴¹ Parts that are not readily replaceable should be considered part of the "substantial embodiment" of the invention.²⁴²

²³⁵ See *supra* Part II.B.2.a.

²³⁶ *Quanta Computer, Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 633 (2008).

²³⁷ *Id.*

²³⁸ *Husky Injection Molding Sys. v. R&D Tool & Eng'g Co.*, 291 F.3d 780, 787 (Fed. Cir. 2002).

²³⁹ See *supra* Part III.D.1.

²⁴⁰ See *supra* Part III.D.1.b.i.

²⁴¹ *Id.*

²⁴² See *supra* Part IV.B.

The first factor from *Aktiebolag*, as interpreted in *Soff-Cut*, looks to whether any elements were replaced and, if so, how extensive the process was to replace the part.²⁴³ As the name implies, a “readily replaceable part” should not require an extensive process to replace.²⁴⁴ While the Federal Circuit has considered, at times, the number of steps involved in the process, other cases indicate that the number of steps is not necessarily indicative of reconstruction.²⁴⁵ For example, in *Aktiebolag* the process involved only four or five steps and was considered infringing,²⁴⁶ while in *Jazz Photo* the process involved eight steps and was deemed non-infringing.²⁴⁷ The number of steps is subjective, as a given process can be divided into as many steps as one wishes.²⁴⁸ The more relevant consideration is whether the process involves the use of any special equipment or training.²⁴⁹ In *Aktiebolag*, for example, the drill re-tipping process involved the use of extremely high temperatures and special machining equipment.²⁵⁰ Finally, according to *Soff-Cut*, the modification, rather than replacement, of a part generally weighs in favor of permissible repair.²⁵¹

The second factor addressed by *Soff-Cut* is the nature of the device.²⁵² Here, the considerations are how quickly the part being replaced wears relative to the combination as a whole and whether the part can be readily separated from the whole.²⁵³ If a given part wears faster than the rest of the combination and if the part can be easily separated from the whole, these are both indications that the part should be considered “readily replaceable.”²⁵⁴

The third factor from *Soff-Cut* to consider is the market for repair.²⁵⁵ The fact that a market has developed for the part that was replaced is evidence

²⁴³ *Soff-Cut Int'l, Inc. v. N.E.D. Corp.*, No. 03-2972, 2004 U.S. Dist. LEXIS 31158, *6-*7 (C.D. Ca. Apr. 8, 2004).

²⁴⁴ *See, e.g.,* *Aktiebolag v. E.J. Co.*, 121 F.3d 669, 673 (Fed. Cir. 1997) (to arrive at the conclusion that the drill tip was not intended to be frequently replaced, the court pointed, in part, to the fact that the tip was “not attached. . . in a manner to be easily detachable”).

²⁴⁵ *Jazz Photo Corp. v. ITC*, 264 F.3d 1094, 1106 (Fed. Cir. 2001).

²⁴⁶ *Aktiebolag*, 121 F.3d at 673.

²⁴⁷ *Jazz Photo Corp.*, 264 F.3d at 1101.

²⁴⁸ *Id.* (arguing that precedent has not always made the extent of the repair process dispositive, but rather looked to whether there was a “second creation” of the patented product).

²⁴⁹ *See generally* *Aktiebolag*, 121 F.3d at 672.

²⁵⁰ *Id.* at 673.

²⁵¹ *Soff-Cut Int'l, Inc. v. N.E.D. Corp.*, No. 03-2972, 2004 U.S. Dist. LEXIS 31158, *16-*17 (C.D. Ca. Apr. 8, 2004).

²⁵² *Id.* at *19-*23. The court in *Soff-Cut* also considered whether the replaced part was “spent,” but the condition of the part before being replaced does not seem relevant to whether the part is “readily replaceable.”

²⁵³ *Id.*

²⁵⁴ *Aktiebolag*, 121 F.3d at 673-74.

²⁵⁵ *Soff-Cut Int'l, Inc.*, 2004 U.S. Dist. LEXIS 31158 at *24-*25.

that the part should be considered “readily replaceable.” However, the lack of a market does not necessarily imply that the part is not readily replaceable, as such a market may not have been able to develop under the threat of infringement.

Finally, *Soff-Cut* looks to the intent of the patentee.²⁵⁶ Although express post-sale restrictions by the patentee are prohibited, there are other ways to infer the patentee’s intent.²⁵⁷ For example, the design of the patented invention can be a telling indication that the patentee intended the part to be replaced before the entire article was spent. However, courts, including the Central District of California in *Soff-Cut*, have acknowledged that the unilateral intent of the patentee alone should not be dispositive.²⁵⁸

D. Readily Replaceable Parts do not Receive Separate Patent Protection Apart from the Combination Simply by Being Claimed Independently

It is clear from the holding in *Quanta* that ownership of an element that “substantially embodies” a patented combination exhausts the rights in the combination as a whole.²⁵⁹ Because “readily replaceable parts” are not considered to fall within the “substantial embodiment” of a patented combination, the patentee has no “separate” patent rights for independently claimed readily replaceable parts.²⁶⁰

E. The Repair or Replacement of Readily Replaceable Parts Protected by a Separate Patent Should be Permissible Repair if the Parts are Sold by the Patentee or Licensed Vendor

Purchasers should have the right to replace parts that are “readily replaceable” and sold by the patentee (or by an authorized dealer thereof). This point seems rather uncontroversial and makes sense with the common notion of “right to repair.” However, if the consumer obtains the part via a transaction that has not been authorized by the patentee, the consumer does not have the right to use the part as a replacement. This is consistent with the idea that “when the structure is unlicensed . . . even repair constitutes infringement.”²⁶¹ Additionally, if a patentee sells a patented replacement part and the purchaser chooses to repair the part rather than purchase the

²⁵⁶ *Id.* at *25.

²⁵⁷ See *Aktiebolag*, 121 F.3d at 673.

²⁵⁸ *Id.* at *25–*26.

²⁵⁹ *Quanta Computer, Inc. v. LG Elecs., Inc.*, 553 U.S. 617, 638 (2008).

²⁶⁰ *Jazz Photo Corp. v. ITC*, 264 F.3d 1094, 1102–03 (Fed. Cir. 2001).

²⁶¹ CHISUM, *supra* note 4, at § 16.03[3], n.6.

replacement, the appropriate analysis would proceed by looking at the patent of the part to decide whether infringement had taken place.

*F. The Repair or Replacement of Unpatented Readily Replaceable Parts
Should Always be Considered Permissible*

The Federal Circuit held in *Husky* that “repair exists if the part being repaired is a readily replaceable part.”²⁶² Of course, the caveat here is that if the part is separately patented it must be obtained from the patentee or a licensed vendor, as discussed above.

V. EXAMPLES APPLYING PROPOSED FRAMEWORK

Most of the opinions written on cases of repair and reconstruction do not provide enough detail about the process in question to evaluate it under the framework proposed herein.²⁶³ However, there are a few cases which do provide sufficient information for assessment.²⁶⁴ An evaluation of some of these cases is offered below to illustrate how the proposed framework could have been applied.

*A. Jazz Photo Corp. v. ITC*²⁶⁵

In *Jazz Photo*, two of the components that were replaced, the battery and the film, could be viewed as “readily replaceable” under *Soff-Cut*.²⁶⁶ The parts were not difficult to remove and replace—the plastic and cardboard shell only had to be cut open, the parts removed, and the shell sealed back up with tape or glue.²⁶⁷ Also, the film and battery definitely would have a shorter lifetime than the rest of the camera.²⁶⁸ Sometimes the winding wheel was also replaced.²⁶⁹ Depending on the design of the camera, the winding wheel may or may not be easy to remove.²⁷⁰ The robustness of the wheel would also need to be evaluated to determine its relative expected lifespan.²⁷¹ Despite the patentee’s intent that the cameras be “single use,” post-sale restrictions are

²⁶² *Husky Injection Molding Sys. v. R&D Tool & Eng’g Co.*, 291 F.3d 780, 787 (Fed. Cir. 2002).

²⁶³ *Orange*, *supra* note 22, at 131.

²⁶⁴ *Id.*

²⁶⁵ 264 F.3d 1094 (Fed. Cir. 2001).

²⁶⁶ *Id.* at 1110–11.

²⁶⁷ *Id.* at 1101.

²⁶⁸ *Id.* at 1105.

²⁶⁹ *Id.* at 1111.

²⁷⁰ *Id.* at 1101.

²⁷¹ *Id.*

not considered relevant in repair-reconstruction decisions.²⁷² Thus, unless the winding wheel was intricately connected with the remainder of the camera or was unusually durable, all of the parts replaced in *Jazz Photo* would likely be deemed "readily replaceable."

Although not all parts of the cameras from *Jazz Photo* were subjected to analysis as "readily replaceable parts," it seems that the parts that were replaced would not belong to the "substantial embodiment" of the patented camera. All of the claims in the camera patent in *Jazz Photo* were directed toward "[a] lens-fitted photographic film package" and no "replaceable parts" were claimed independently.²⁷³ Additionally, none of the parts replaced in *Jazz Photo* were separately patented.²⁷⁴ Since the parts used in *Jazz Photo* were unpatented and readily replaceable, the activity in question should have been considered permissible repair and was so held by the court.²⁷⁵

*B. Dana Corp. v. Am. Prec. Co.*²⁷⁶

In the court's opinion in *Dana*, the process used for rebuilding the clutches was not clearly articulated.²⁷⁷ However, the court stated that Dana fully intended that its clutches be repairable²⁷⁸ and even sent new parts to the defendant builder.²⁷⁹ Thus, it seems that Dana conceded that the parts in question were readily replaceable.²⁸⁰ Dana's argument was based not on the fact that its clutches were being rebuilt, but that some of the rebuilt clutches contained parts that came from a different vendor.²⁸¹ However, none of the component parts in dispute in *Dana* were patented.²⁸² Because the replacement of unpatented readily replaceable parts should always be permissible, the defendant should not have been, and was not, held liable for infringement.²⁸³

²⁷² 264 F.3d at 1108.

²⁷³ U.S. Patent No. 4,884,087 col. 17 l. 15—col. 20 l. 38 (filed Nov. 29, 1989).

²⁷⁴ *Jazz Photo Corp.*, 264 F.3d at 1107.

²⁷⁵ *Id.* at 1099.

²⁷⁶ 827 F.2d 755 (Fed. Cir. 1987).

²⁷⁷ *Id.* at 758.

²⁷⁸ *Id.* at 759.

²⁷⁹ *Id.* at 756.

²⁸⁰ *Id.* at 757.

²⁸¹ *Kuther v. Leuschner*, 827 F.2d 755, 757 (Fed. Cir. 1987).

²⁸² *Id.* at 756.

²⁸³ *Id.* at 760.

*C. Kuther v. Leuschner*²⁸⁴

The process in question in this case was held as a reconstruction by the lower court, but ultimately that decision was overturned by the Supreme Court.²⁸⁵ The facts of *Kuther* indicate that the repaired parts would not be considered "readily replaceable" under *Soff-Cut*.²⁸⁶ The process carried out on the machine was quite extensive and the parts that were involved were not expected to have a shorter lifespan than the rest of the machine.²⁸⁷ Therefore, the process was likely performed on what would be deemed the "substantial embodiment" of the machine. Had the machine been restored to its original condition, a finding of infringing reconstruction probably would have been appropriate. However, the machine in this case was not "repaired," but rather modified to accommodate different sizes of cans.²⁸⁸ Thus, labeling the process at issue in *Kuther* as a "reconstruction" would be false—the defendant simply did not "make" the patented article.²⁸⁹ Therefore, even though the Supreme Court arrived at its decision using a much different rationale than the framework proposed in this Note, the outcome is still appropriate.

*D. Aro Mfg. Co. v. Convertible Top Replacement Co.*²⁹⁰

The application of the proposed framework to the facts of *Aro* may lead to a different conclusion than was drawn by the U.S. Supreme Court in 1961. At issue in *Aro* was the replacement of the fabric of a patented convertible car top.²⁹¹ Nine of the ten independent claims in the patent for the convertible top were directed toward "the combination of a lower metal body structure [and] . . . a folding bow structure . . . having a flexible top material."²⁹² No separate patent existed for the "flexible top material," i.e. the fabric itself.²⁹³ Therefore, under the proposed framework, the owner's right to replace the fabric would depend upon whether the top material is considered part of the

²⁸⁴ *Kuther v. Leuschner*, 200 F. Supp. 841 (N.D. Cal. 1961), *rev'd*, 377 U.S. 422 (1964). *See supra* Part III.B for more details about the machine and repair process.

²⁸⁵ *Wilbur-Elis Co. v. Kuther*, 377 U.S. 422 (1964).

²⁸⁶ *Kuther v. Leuschner*, 200 F. Supp. at 843.

²⁸⁷ *Id.* at 844.

²⁸⁸ *Id.*

²⁸⁹ *Id.* at 845.

²⁹⁰ *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336 (1961).

²⁹¹ *Id.* at 337-38.

²⁹² U.S. Patent No. 2,569,724 col. 3 l. 36-col. 6 l. 6 (filed Oct. 2, 1951).

²⁹³ *Aro*, 365 U.S. at 339.

“substantial embodiment” or as a “readily replaceable part” of the patented convertible top.

To determine if the flexible top material should be considered a readily replaceable part, the proposed framework requires an assessment of the repair process, as well as the car top design, using the factors from *Aktiebolag* as interpreted in *Soff-Cut*. For example, the Court in this case would look to factors such as how the fabric was fastened to the underlying “bow structure” and if the manufacturer anticipated that the fabric would need to be replaced before the remaining components of the car top ceased to function. Regardless of the intent of the manufacturer, it is possible that the flexible top material would be deemed a readily replaceable part if the fabric material could be separated from the underlying bow structure using standard industry machinery, tools, and training and if such separation could be accomplished without causing damage to the bow structure itself.

If the Court were to decide that the flexible top material claimed in the patent was readily replaceable, the outcome of *Aro* would be the same: the replacement of the fabric constituted a permissible repair. However, consider the outcome if the Court were to determine that the top material should be viewed as part of the substantial embodiment of the patented convertible car top combination. In that case, once the fabric top became worn, the owner of the car top would no longer possess the substantial embodiment of the patented combination, but something less. Because, under the proposed framework, the right to repair a patented combination attaches to ownership of its substantial embodiment, the owner of the car top in *Aro* would not have the right to replace the worn fabric if the flexible top material was considered part of the substantial embodiment.

The facts provided in the *Aro* case, even in conjunction with the patent specification and claims, are insufficiently detailed to allow one to determine whether or not the fabric should have been deemed “readily replaceable” or included as part of the “substantial embodiment” of the car top. However, it should be noted that under the proposed framework, the analysis of the legality of a repair would be highly focused on the repair process itself. This distinguishes the proposed framework from the rationales used by the district and appellate courts in *Aro*—rationales that were both ultimately rejected by the Supreme Court. The district court in *Aro* focused on the inventive or novel nature of the component being replaced,²⁹⁴ while the First Circuit looked mostly to the expected lifespan of the fabric and to the relative expense of the

²⁹⁴ See *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 270 F.2d 200, 203 (1st Cir. 1959) (internal punctuation omitted) (referring to the District Court’s reliance on the novel shape of the fabric top as evidence that the fabric was a “material part of the invention”).

repair.²⁹⁵ Thus, it is possible that had a process-based lens been applied in the Court's review of the *Aro* repair, the outcome may have been different.

VI. CONCLUSION

Since even the earliest cases regarding the issue, courts have struggled to formulate a clear standard for assessing whether repair constitutes a "making."²⁹⁶ Much of the confusion surrounding this topic is centered upon the fact that the Supreme Court has not articulated how much of a patented article a consumer must own to maintain the right to repair the article as a whole.²⁹⁷ The Supreme Court's 1961 decision in *Aro* offered little, if any, real clarity on the issue and eschewed the use of any factor-based analysis.²⁹⁸ In the majority of cases since then, courts have decided that the safest route for avoiding the *Aro* ambiguity is to hold repairs as permissible.²⁹⁹ Because traditionally it has been difficult to prove that a patented combination is "spent,"³⁰⁰ courts have been able to safely stay within the boundaries of *Aro* with little analytical investment.

A few lower courts, and even the Federal Circuit Court, have bucked this trend from time to time and employed a more robust framework for repair-reconstruction inquiries.³⁰¹ Most notably, in *Aktiebolag* the Federal Circuit introduced a multifactor based analysis that has been adopted by some lower courts.³⁰² Although the *Aktiebolag* factors may not square with the precedent in *Aro*, at least one commentator has suggested that the actual *Aro* holding may not be as restrictive as it seems.³⁰³ Nonetheless, because the *Aktiebolag* factors have not yet been challenged at the Supreme Court, the Federal Circuit's factor-based analysis remains good law.³⁰⁴

²⁹⁵ *Id.* at 205.

²⁹⁶ *See supra* Parts II and III.

²⁹⁷ *Aro*, 365 U.S. at 345.

²⁹⁸ *Id.*

²⁹⁹ *See Sease, supra* note 82, at 102. *See also* the review of the caselaw provided in Section III of this paper.

³⁰⁰ *See supra* Part III.B.

³⁰¹ *See supra* Parts III.B, D.

³⁰² *See supra* Part III.D.

³⁰³ Janis, *supra* note 66, at 506 n.461 (suggesting that the Court in *Aro* arguably "limited its denigration of the multifactor approach to dicta").

³⁰⁴ *Id.* In 1999, Janis stated that the Federal Circuit needed to resolve the apparent contradiction between *Aktiebolag* and *Aro*, stating, "The Federal Circuit should, at a minimum, make clear either that *Aro I* does not absolutely forbid the all circumstances approach, or that after nearly forty years of experience with *Aro I*, in which courts have inevitably resorted to multiple-factor approaches, the Supreme Court would not be likely to follow *Aro I*'s reasoning should the issue be presented to the Court today." *Id.* Such clarification has yet to be made.

More recently, the Supreme Court itself has used language that is incongruent with *Aro*.³⁰⁵ In *Quanta Computer, Inc. v. LG Electronics, Inc.*, Justice Thomas indicated that ownership of a "substantial embodiment" of a combination patent would exhaust the patentee's rights in the entire combination.³⁰⁶ Thus, a logical extension of this principle would be for permissible repair to only extend to those elements that do not constitute the "substantial embodiment" of the patented invention. The substantial embodiment of a patented article can be defined as the patented article as a whole minus any "readily replaceable parts." To identify which parts are readily replaceable, courts can apply the factors put forth by the Supreme Court in *Aktiebolag* as interpreted by the Northern District of California in *Soff-Cut*.³⁰⁷

The outcomes of most repair and reconstruction cases that have been decided up to this point would not likely differ under the proposed framework, as the bar for establishing impermissible reconstruction would still be quite high. Nevertheless, having a more clearly articulated standard for determining the line between permissible repair and infringing reconstruction would allow courts to have a consistent approach to evaluating these cases and would allow patent practitioners to better advise clients who are seeking either to avoid or enforce infringement claims. Until the Supreme Court offers further clarification, the framework proposed in this Note offers a resolution that is consistent with contemporary jurisprudence and avoids many of the issues that have long made repair-reconstruction cases so perplexing.

³⁰⁵ *Quanta Computer, Inc. v. LG Electronics, Inc.*, 553 U.S. 617, 635 (2008).

³⁰⁶ *Id.*

³⁰⁷ *See supra* Part III.B.

