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FUNCTIONALITY SCREENS[+]

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Among intellectual property ("IP") doctrines, only utility patents should protect function. Utility patents offer strong rights that place constraints on competition, but they only arise when inventors can demonstrate substantial novelty after a costly examination. Copyrights, trademarks, and design patents are much easier to obtain than utility patents, and they often last much longer. Accordingly, to prevent claimants from obtaining "backdoor patents," the other IP doctrines must screen out functionality. As yet, however, courts and scholars have paid little systematic attention to the ways in which these functionality screens operate across and within IP law.

We have four tasks in this Article. First, we identify three separate functionality screens that IP laws use: Filtering, Exclusion, and

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Threshold. Second, we illustrate the use of these different screens in copyright, trademark, and design patent laws. Each law takes a different approach to screening functionality. Third, we model the relative costs and benefits of the different screening regimes, paying particular attention to administrative and error costs and how these costs affect incentives and competition. Finally, we assess the current screening regimes and offer suggestions for how they might be improved.

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INTRODUCTION

INTELLECTUAL property ("IP") regimes protect various kinds of invention and creativity in various ways. But most of those regimes do not protect the function of a product, device, or process. Only utility patents are supposed to protect function. Copyright, trade dress,[1] and design patents all have exceptions or defenses designed to ensure that the rights they confer do not extend to the functional aspects of a product.

Preventing non-utility patent IP regimes from protecting function makes good sense. Conferring market power over function can significantly restrict the freedom of others to compete, driving up costs for consumers and limiting access to products. Before the law allows this, it should have strong evidence that such a powerful IP right is necessary. Patent law has both a higher threshold for protection and a shorter term than copyright and trade dress law, and it is harder to get a utility patent than a design patent.[2] Without the ability to screen out functionality, creators could use copyright, trade dress, or design patent law to obtain the equivalent of a utility patent without having to do the work required to get one. The functionality doctrines, then, serve a channeling function, routing people who want to control function to utility patent law.

At least, that's the way the law is supposed to work. In practice, the functionality doctrines are a hodgepodge. Trade dress law has two different functionality doctrines, and the primary functionality doctrine has two legal standards that seem inconsistent with each other.[3] Nonetheless, trade dress may actually be the clearest and most successful of the functionality doctrines. Copyright's functionality rules differ depending on the subject matter of the copyrighted material, and

[1] We use the terms "trademark" and "trade dress" somewhat interchangeably in referring to IP protection for product designs. Sorry to the purists this doubtless offends.

[2] See infra text accompanying notes 26–50.

[3] See infra notes 203–27 and accompanying text.

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they have been called a "metaphysical quandary" by one court.[4] Design patent's functionality doctrine, while ostensibly central to the law, has been effectively eliminated as a practical matter by the courts.[5] A remarkable example of the divergence in the rules is *Apple Inc. v. Samsung Electronics Co.*, where the U.S. Court of Appeals for the Federal Circuit held that the very same iPhone and iPad designs *were* functional under trade dress law but *were not* functional under design patent law.[6]

Part of the problem is that Congress and the courts have not coordinated the various functionality doctrines across different IP regimes, allowing them to develop in the appropriate ways.[7] But there is a more systematic problem. Courts do not even have a consistent way of thinking about *how* to screen functionality. We therefore begin by identifying and classifying the various ways in which IP laws approach functionality.[8] Depending on the doctrine and the court, functionality can be screened out in three distinct ways: first, by excluding the category of work or design from protection altogether (Exclusion); second, by granting IP protection but filtering out the functional aspects of the design in court (Filtering); or third, by creating a minimum threshold of non-functional content that is required for protection, with exclusion below the threshold and filtering beyond it (Threshold). We call these different approaches functionality screens. We then illustrate how and when copyright, trade dress, and design patent laws use the different functionality screens (and sometimes more than one within a legal regime).[9]

[4] Universal Furniture Int'l v. Collezione Europa USA, 618 F.3d 417, 434 (4th Cir. 2010) (finding that decorative elements of furniture design were conceptually separable and protectable features of a useful article).

[5] See infra notes 226–45.

[6] 786 F.3d 983, 994, 996, 998–99 (Fed. Cir. 2015), rev'd on other grounds, 137 S. Ct. 429 (2016).

[7] Another major problem with functionality in IP doctrines involves the difficulty of determining what counts as "functional" in the first place. See, e.g., Mark P. McKenna & Christopher Jon Sprigman, What's In, and What's Out: How IP's Boundary Rules Shape Innovation, 30 Harv. J.L. & Tech. 491, 491–94 (2017). This Article discusses the approaches various legal rules take to this question in detail below.

[8] See infra Part II.

[9] See infra Part III.

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The different functionality screens have significant impacts on the nature of IP protection. If the regime applies the Exclusion screen, a work or design receives no protection whatsoever even though it may contain otherwise non-functional content. By contrast, the Filtering screen will protect aspects of works or designs that are almost entirely functional as long as they contain some degree of protectable content. And the Threshold screen produces distinct variation in protection depending on whether the work or design clears the threshold or not (and depending on whether the court accurately determines whether it does).

Next, we offer a theoretical account of when various types of functionality screens are appropriate.[10] The choice of functionality screen should logically relate to the difficulty of identifying functional elements, the accuracy with which courts can separate functional from non-functional elements, and how important the functional elements are in the product. We analyze the administrative and error costs associated with using the different functionality screens.[11] Finally, we apply our theoretical account to the law as it exists today, both explaining why different regimes sometimes use different functionality screens and finding ways to align the functionality doctrines in various fields with the costs and benefits of each approach.[12] We discuss situations in which a legal regime is likely using the correct functionality screen and situations in which a shift to a different screen is appropriate. Our analysis has implications for a number of legal doctrines, and offers an early analysis of the recent U.S. Supreme Court case concerning the copyrightability of cheerleader uniforms, *Star Athletica v. Varsity Brands*.[13]

In Part I, we discuss the reasons for the functionality doctrines. In Part II, we describe the toolbox of what we call "functionality screens." In Part III, we explore the inconsistent ways in which different IP doctrines implement functionality rules. Finally, in Part IV we discuss when each

[10] See infra text accompanying notes 244–73.

[11] See infra Section IV.A.

[12] See infra text accompanying notes 288–333.

[13] 137 S. Ct. 1002 (2017).

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type of screen makes sense, and we evaluate how well various legal doctrines apply these functionality screens.

I. WHY SCREEN FUNCTIONALITY IN IP LAW?

In theory, each of the principal fields of IP law protects discrete kinds of behavior or activity. Utility patent law governs useful inventions,[14] copyright law governs expressive works of authorship,[15] design patent law covers ornamental features of objects,[16] and trademark law protects marks or signs that convey the source of goods.[17] Indeed, traditionally the separation was so great that the law required IP owners to choose one and only one form of IP protection.[18] This doctrine of "election" channeled creative activity into the proper IP regime, and prevented overlap between the laws.[19] Eventually, however, it proved unworkable for the simple reason that it assumed any given product was either an invention *or* a design *or* a work of authorship.[20]

[14] 35 U.S.C. § 101 (2012) ("Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.").

[15] 17 U.S.C. § 102(a) (2012) ("Copyright protection subsists, in accordance with this title, in original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.").

[16] 35 U.S.C. § 171(a) (Supp. III 2015) ("Whoever invents any new, original and ornamental design for an article of manufacture may obtain a patent therefor, subject to the conditions and requirements of this title.").

[17] 15 U.S.C. § 1125(a)(1) (2012) ("Any person who, on or in connection with any goods or services, or any container for goods, uses in commerce any word, term, name, symbol, or device, or any combination thereof, or any false designation of origin, false or misleading description of fact, or false or misleading representation of fact, which . . . is likely to cause confusion, or to cause mistake, or to deceive as to the affiliation, connection, or association of such person with another person, or as to the origin, sponsorship, or approval of his or her goods, services, or commercial activities by another person . . . shall be liable in a civil action by any person who believes that he or she is or is likely to be damaged by such act.").

[18] In re Blood, 23 F.2d 772, 772 (D.C. Cir. 1927) (holding hosiery label was not entitled to "double registration").

[19] Id.

[20] The doctrine was abandoned in 1974. See Application of Yardley, 493 F.2d 1389, 1394 (C.C.P.A. 1974) (holding that a watch featuring the image of Vice President Spiro Agnew could be protected by more than one IP regime). For a discussion of how to deal with

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In practice, many objects combine aspects of one or more of these features. Consider, for example, a newly designed desk chair. The chair may have an innovative support system that holds the sitter's weight in a more efficient manner. The support system could potentially receive a utility patent. The chair might also incorporate a decorative pattern on its fabric that could be copyrightable. Various aspects of the chair's design might be ornamentally pleasing such that they could obtain design patent protection. And the chair's overall design or some feature of it could be so distinctive that whenever consumers see it they know that it comes from a particular maker. These features could be subject to trademark protection.

This example is actually a relatively easy one for IP law because the different aspects of the chair, such as the patentable support system and the copyrightable fabric, are distinct and readily identifiable from one another. But we can easily imagine a situation in which the design of the support system is simultaneously useful, beautiful, and source-identifying. Consumers of the Herman Miller Aeron Chair might be impressed by its stability and comfort, struck by its appealing visual form, *and* able to recognize the design as one sold by Herman Miller.[21] Or the shape of a Tesla might at the same time improve its aerodynamics and therefore change the way it drives, be viewed as attractive design, and signal to passersby that it is in fact a Tesla. In such a case, the different fields of IP law become intertwined. As products become increasingly complex, this overlap is more and more common.[22]

The challenge for IP laws, then, involves sorting out how each of these different legal regimes applies to a product.[23] Incorrect sorting can

overlaps, see Laura A. Heymann, Overlapping Intellectual Property Doctrines: Election of Rights Versus Selection of Remedies, 17 Stan. Tech. L. Rev. 239 (2013).

[21] John R. Berry, Herman Miller: The Purpose of Design 1 (2004).

[22] See, e.g., Brandir Int'l v. Cascade Pac. Lumber Co., 834 F.2d 1142, 1143 (2d Cir. 1987) (considering the functionality of an artistic bicycle rack).

[23] See Viva R. Moffat, Mutant Copyrights and Backdoor Patents: The Problem of Overlapping Intellectual Property Protection, 19 Berkeley Tech. L.J. 1473, 1474–77 (2004); Pamela Samuelson, Strategies for Discerning the Boundaries of Copyright and Patent Protections, 92 Notre Dame L. Rev. 1493 (2017) [hereinafter Samuelson, Strategies for Discerning]; see, e.g., Pamela Samuelson, Why Copyright Law Excludes Systems and Processes from the Scope of Its Protection, 85 Tex. L. Rev. 1921, 1921–24 (2007)

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have enormous consequences for the efficient functioning of IP systems. Each of the different fields of IP law enacts a particular set of tradeoffs about the nature of the legal protection that owners receive.[24] The different IP regimes exist to solve different economic problems, so the rights that owners receive are calibrated to match the nature of those problems.[25] Utility patent protection differs from copyright protection, design patent protection, and trademark protection in a number of important ways because lawmakers believe that the kinds of activities associated with each field require particularized treatment.

It is much harder to get a utility patent than to get a design patent, trademark, or copyright.[26] Copyright protection is essentially automatic when an author creates a work.[27] Trade dress protection can be automatic when a company adopts a brand, though courts have required evidence of secondary meaning in an important class of cases (those that involve the shape of the product itself).[28] Design patents require examination, but that examination virtually never causes a design patent to be rejected.[29] Similarly, patents (here including design patents) expire relatively quickly, while trade dress can theoretically last forever and copyrights last virtually forever.[30] While the balance is certainly not

[hereinafter Samuelson, Why Copyright Law Excludes]; Lloyd L. Weinreb, Copyright for Functional Expression, 111 Harv. L. Rev. 1149, 1150–54 (1998).

[24] William M. Landes & Richard A. Posner, The Economic Structure of Intellectual Property Law 1–10 (2003).

[25] Id.; Clarisa Long, Information Costs in Patent and Copyright, 90 Va. L. Rev. 465, 495 (2004).

[26] Though perhaps not as hard as it should be. See Mark P. McKenna & Katherine J. Strandburg, Progress and Competition in Design, 17 Stan. Tech. L. Rev. 1, 2–3 (2013) (noting that IP can too easily prevent competition in design).

[27] 17 U.S.C. § 102(a) (2012) ("Copyright protection subsists . . . in original works of authorship fixed in any tangible medium of expression . . . .").

[28] See infra notes 197–201 and accompanying text.

[29] See Dennis D. Crouch, A Trademark Justification for Design Patent Rights 7 (Univ. of Mo. Sch. of Law, Research Paper No. 2010-17, 2010), http://ssrn.com/abstract=1656590 [https://perma.cc/6EGT-3B4B] (finding that 98% of design patent applications are not challenged for novelty).

[30] Copyrights last for the life of the author plus seventy years post mortem for works created by human authors. 17 U.S.C. § 302(a) (2012). Patents, by contrast, expire after twenty years. 35 U.S.C. § 154 (2012). And trademark rights can be renewed indefinitely as long as they are in use. 15 U.S.C. § 1059 (2012).

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perfect, the basic idea is that utility patents confer stronger rights—rights over functions—but are correspondingly harder to get and don't last as long.

Consider the contrast between patent and copyright law, for instance.[31] Patent law establishes a high threshold for inventors. They must establish that their discoveries had never been known before and that they were sufficiently clever that ordinary practitioners in the field were not likely to have thought of them.[32] Copyright law, by contrast, imposes the lowest of hurdles for rights seekers. To obtain copyrights, authors must only produce works that are original and that exhibit more than merely trivial creativity.[33] Originality, in the copyright sense, does not entail novelty; instead, authors can obtain copyrights as long as their works are original *to them*, that is, not copied from elsewhere.[34] An author may write a poem or a song that is similar (or even identical) to other poems or songs, but she can still obtain a copyright as long as she did not copy it from one of the earlier works.[35] In addition, the creativity threshold that copyright law applies is meager by comparison to patent law. Copyright law generally avoids substantial analysis of the aesthetic value of works and, instead, grants rights to any works that exhibit some

[31] See generally Viva R. Moffat, The Copyright/Patent Boundary, 48 U. Rich. L. Rev. 611, 611–12 (2014) (discussing the contrast between copyright and patent law).

[32] On IP thresholds, see Christopher Buccafusco, Zachary C. Burns, Jeanne C. Fromer & Christopher Jon Sprigman, Experimental Tests of Intellectual Property Laws' Creativity Thresholds, 92 Tex. L. Rev. 1921, 1926–28 (2014); Joseph Scott Miller, Hoisting Originality, 31 Cardozo L. Rev. 451, 464, 488–89 (2009); Gideon Parchomovsky & Alex Stein, Originality, 95 Va. L. Rev. 1505, 1507 (2009).

[33] Feist Publ'ns v. Rural Tel. Serv. Co., 499 U.S. 340, 345 (1991) ("Original, as the term is used in copyright, means only that the work was independently created by the author (as opposed to copied from other works), and that it possesses at least some minimal degree of creativity." (citing 1 M. Nimmer & D. Nimmer, Copyright §§ 2.01[A], [B] (1990))).

[34] Id. ("Originality does not signify novelty; a work may be original even though it closely resembles other works so long as the similarity is fortuitous, not the result of copying.").

[35] Sheldon v. Metro-Goldwyn Pictures Corp., 81 F.2d 49, 54 (2d Cir. 1936) ("[I]f by some magic a man who had never known it were to compose anew Keats's Ode on a Grecian Urn, he would be an 'author,' and, if he copyrighted it, others might not copy that poem, though they might of course copy Keats's." (citing Bleistein v. Donaldson Lithographing Co., 188 U.S. 239, 249 (1903))). On the independent creation doctrine in copyright law, see generally Abraham Drassinower, What's Wrong With Copying? (1st prtg. 2015) (discussing the importance of copying to copyright infringement).

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bare modicum of creative spark.[36] For example, while a white pages phonebook may fail to clear this threshold, a yellow pages phonebook of Chinese businesses in New York City can sail over it.[37]

Furthermore, while patent law imposes a substantial, lengthy, and expensive examination before the Patent Office before rights attach, copyrights vest at the moment the work is created.[38] As soon as a painter sets her brush to the canvas, she obtains a copyright in the painting.[39] Copyright law does allow for registration, and it requires registration to commence a lawsuit, but registration is typically pro forma and does not include substantial examination by the Copyright Office.[40] Moreover, the copyright registration process is considerably cheaper and quicker than patent examination.

Copyright law also allows claims of infringement based on less similarity than patent law. While in some respects copyrights are less powerful than patents—for instance, they don't prevent independent development, and they are subject to fair use and other limitations—in other respects copyrights reach more broadly.[41] To infringe a patent, a defendant's product must include every element in the patent claim.[42] By contrast, a work can infringe a copyright while copying less than all of another work.[43] Indeed, copying only a small fraction of a protected work can sometimes be enough.[44] In addition, copyright law in some

[36] *Bleistein*, 188 U.S. at 251 ("It would be a dangerous undertaking for persons trained only to the law to constitute themselves final judges of the worth of pictorial illustrations, outside of the narrowest and most obvious limits.").

[37] See Key Publ'ns v. Chinatown Today Publ'g Enters., 945 F.2d 509, 514 (2d Cir. 1991).

[38] See, e.g., Mark A. Lemley, Peter S. Menell & Robert P. Merges, Intellectual Property in the New Technological Age: Perspectives, Trade Secrets and Patents, at III-3 to III-4, III-10 to III-11 (2016 ed.) [hereinafter IPNTA].

[39] See 17 U.S.C. § 102(a) (2012).

[40] E.g., Stef van Gompel, Formalities in Copyright Law: An Analysis of Their History, Rationales and Possible Future 40 (2011) ("[N]o substantive examination of the copyrightability of a work is performed before registration.").

[41] IPNTA, supra note 38, at IV-9.

[42] Id. at III-368.

[43] Id. at IV-147.

[44] Id.

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respects grants original authors greater control over downstream uses of their works than does patent law.[45]

Finally, copyrights last much longer than patents. Although patents and copyrights lasted for similar periods under their respective initial enactments in 1790,[46] copyright terms have grown exponentially. Under the current 1976 Copyright Act, copyright persists for the natural life of the author plus an additional 70 years post mortem.[47] For works made for hire, anonymous, and pseudonymous works, copyright persists for 120 years from the date of the work's creation or 95 years from its publication, whichever is shorter.[48] Compared to these terms, the 20-year patent term seems incredibly brief.[49]

The substantial differences between copyright law and utility patent law reflect the different balances that Congress has struck.[50] Anxious about the anticompetitive effects of exclusive rights in useful inventions, Congress has established steeper barriers and shorter duration for utility patents. Although copyright law incorporates some doctrines that weaken the protection offered to authors—including the idea/expression distinction, the independent creation doctrine, and fair use—its low creativity threshold, lack of examination, and lengthy duration project a different balancing of upstream incentives and downstream access for expressive works of authorship.

Trademark and design patent laws reflect similar tradeoffs. Trademarks potentially last forever, giving the creator the possibility of

[45] Stefan Bechtold, Christopher Buccafusco & Christopher Jon Sprigman, Innovation Heuristics: Experiments on Sequential Creativity in Intellectual Property, 91 Ind. L.J. 1251, 1259 (2016); Mark A. Lemley, The Economics of Improvement in Intellectual Property Law, 75 Tex. L. Rev. 989, 991–92 (1997). The broader power to control derivative works and improvements is, however, balanced by copyright's fair use doctrine, a doctrine patent law lacks.

[46] Copyrights originally lasted for fourteen years with an additional fourteen-year renewal term. See Act of May 31, 1790, ch. 15, 1 Stat. 124, 124 (entitled "An Act for the encouragement of learning") (repealed 1802). The original patent act limited duration to a fourteen-year term. Patent Act of 1790, ch. 7, 1 Stat. 109, 109–12 (repealed 1793).

[47] 17 U.S.C. § 302 (2012).

[48] Id. § 302(c).

[49] 35 U.S.C. § 154 (2012).

[50] Moffat, supra note 23, at 1485–87.

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perpetual protection.[51] They can be protected at common law with no examination at all.[52] And inherently distinctive trade dress can be protected automatically, simply by using the design in commerce.[53] While design patents look in some respects more like utility patents, with examination by the U.S. Patent and Trademark Office ("PTO") and shorter terms, in practice it is much easier to obtain a design patent than a utility patent. Design patents are rarely rejected or even questioned based on the existence of other prior designs.[54] The overwhelming majority of design patent applications are granted.[55] And they issue much more quickly than utility patents.[56]

Trade dress and design patent protection are easier to obtain and (in the case of trade dress) longer-lasting than utility patents. As with copyright law, the ease and length of protection are counterbalanced by significant limitations on the scope of the rights. Design patents are supposed to cover only ornamental features of products, not their functional attributes.[57] Trade dress protection covers only those aspects of a design that signal source to consumers, and the law refuses protection for functional design features even if they signal source.[58] In addition, courts have restricted the ability of trade dress to protect the shape or color of a product itself without proof that consumers associate the design with a particular source.[59] And trademark law permits competitors to use another's marks to describe their own products or to make truthful reference to the owner's products.[60]

Patent law protects the functional aspects of a product, by which we mean things that make a product work at all, or better, or with fewer

[51] See 15 U.S.C. § 1059(a) (2012).

[52] See id. § 1125(a) (providing for an action for infringement even in the absence of trademark registration).

[53] See Two Pesos v. Taco Cabana, 505 U.S. 763, 775–76 (1992).

[54] Crouch, supra note 29, at 7.

[55] Id.

[56] Id. at 17.

[57] See 35 U.S.C. § 171(a) (1952) (amended 2012).

[58] See infra notes 198–203.

[59] Wal-Mart Stores v. Samara Bros., 529 U.S. 205, 212–14 (2000); Qualitex Co. v. Jacobson Prods. Co., 514 U.S. 159, 171–73 (1995).

[60] See, e.g., Zatarains, Inc. v. Oak Grove Smokehouse, 698 F.2d 786, 796 (5th Cir. 1983).

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defects, or more cheaply.[61] Functionality doctrines exist to prevent creators from characterizing things that belong in the utility patent realm as being copyrightable or protectable by design patents or trademarks instead. When aspects of a good are mischaracterized, the carefully calibrated balancing can fall apart. If we let them, creators will seek "backdoor patents" by acquiring copyrights, trade dress, or design patents and then assert those rights against competitors who copy the functional rather than artistic or source-identifying aspects of their products.[62] Indeed, this sort of overreach is common in IP cases today.[63] Doing so creates significant social harm, because it interferes with the norm of free competition in the making of products.[64] Utility patents carve out an exception to that norm, which is arguably justified by the need to encourage invention. But copyright, design patent, and trade dress law, while they have their own purposes, don't need to give owners control over the functional (as opposed to expressive, ornamental, or source-identifying) aspects of those products.

The issue is somewhat more complicated than this suggests, because it is possible that the same aspect of a product can serve both a functional and a non-functional purpose.[65] Imagine, for instance, that

[61] For a detailed discussion of what the law means to include in the functional aspects of a work protected by patent, as opposed to copyright or trade dress law, see McKenna & Sprigman, supra note 7. McKenna and Sprigman argue that one reason functionality rules in non-patent IP doctrines are so problematic is that patent law lacks a coherent account of what it does and does not protect. Id. at 494.

[62] Smith & Hawken, Ltd. v. Gardendance, Inc., No. C 04-1664 SBA., 2005 WL 1806369, at *3 (N.D. Cal. July 28, 2005) ("The useful article doctrine serves the important policy of keeping patent and copyright separate by preventing parties from using copyright to obtain a 'backdoor patent' on a functional article that cannot be patented." (citing 17 U.S.C. § 102(b))).

[63] See, e.g., Mark A. Lemley & Mark P. McKenna, Scope, 57 Wm. & Mary L. Rev. 2197, 2281 (2016) (discussing this problem).

[64] Stacey L. Dogan & Mark A. Lemley, A Search-Costs Theory of Limiting Doctrines in Trademark Law, 97 Trademark Rep. 1223, 1247–49 (2007) [hereinafter Dogan & Lemley, Limiting Doctrines].

[65] This is a particular risk with trade dress law. Copyright and design patent, by contrast, have purposes that parallel patent law; it is just that they are trying to encourage the creation of different things. So it is less likely that the law will need to protect something functional under design patent law because it is also ornamental. More on this infra notes 70–79 and accompanying text.

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shredded wheat cereal biscuits both identify the manufacturer and taste better (or are easier to make) than other shapes. One approach might be to say that each IP regime can separately protect the functional aspects of a product—utility patent law because the biscuit design is functional and trademark law because it also identifies source. In fact, however, courts have rejected that approach.[66] The risk of a perpetual patent is sufficiently great that courts treat an expired utility patent as preempting efforts to control the patentable aspects of the invention after the patent expires.[67] The same is arguably true when a technology is eligible but does not qualify for patent protection, for example because it is functional but well-known or obvious. Patent law preempts state laws that seek to protect unpatentable inventions.[68] The same should be true of trademark law. The risk of giving a trademark owner a backdoor patent is substantial, and the likely benefits of treating a functional design element as a source identifier are pretty small. After all, many other, non-functional elements can serve a source-identifying function instead. If the manufacturer wants consumers to know that the biscuits come from its company, it can use other text or picture marks to signify the relationship.

The functionality screens we discuss below serve the valuable purpose of allowing non-patent IP regimes to have longer terms and lower thresholds for protection without giving rightsholders control over competition.[69] Design patents, copyright, and trade dress all have such

[66] TrafFix Devices v. Mktg. Displays, 532 U.S. 23, 33, 35 (2001); Kellogg Co. v. Nat'l Biscuit Co., 305 U.S. 111, 114, 121–22 (1938). For discussion of the oddity of *Kellogg* as a hybrid genericness-functionality case, see Jake Linford, A Linguistic Justification for Protecting "Generic" Trademarks, 17 Yale J.L. & Tech. 110, 160–61 (2015).

[67] *TrafFix Devices*, 532 U.S. at 33–35.

[68] See Bonito Boats v. Thunder Craft Boats, 489 U.S. 141, 168 (1989); Sears, Roebuck & Co. v. Stiffel Co., 376 U.S. 225 (1964); Compco Corp. v. Day-Brite Lighting, 376 U.S. 234 (1964).

[69] Functionality is not all or even most of what those laws exclude. And some exclusions for functionality overlap with other doctrines, such as originality or the idea-expression dichotomy in copyright law. We consider those doctrines only insofar as they affect functionality. We recognize that they have other purposes for which a different analysis might apply. And it is important to recognize that not everything that is non-functional is therefore protected by a particular IP regime.

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doctrines. As we will see in the next Parts, however, they diverge widely in how the courts apply them.

II. FUNCTIONALITY SCREENS

In order to preserve their unique balances of rights and obligations, copyright, design patent, and trademark law all ostensibly attempt to exclude the functional features of goods from protection. Yet the doctrines that they exploit to screen functionality differ. Here, we identify the three basic techniques non-utility patent IP regimes use to avoid protecting functional elements. We call these doctrines "functionality screens." As we explain in Part III, different IP regimes use different types of screens in different circumstances. We should explain, though, that when a particular functionality screen is used, it is typically applied to a whole field or range of works, designs, or marks. Courts do not select among them on a case-by-case basis.

To understand the nature of functionality screens in IP, we begin by proposing a simplified model of product design. Below, we add further complexity to the model.

Consider the total number of features in a given product that might be protected by IP law.[70] Some number of these features will be functional or utilitarian. For example, the engine displacement, crumple zones, and braking system of an automobile are functional features of the car. Other features of a product will be aesthetic, ornamental, source-identifying, or expressive, such as the car's jaguar-shaped hood ornament. We will refer to these features of product design as non-functional. The goal of each of the screening doctrines is to prevent designers from attaining copyright, design patent, or trademark rights in the functional features of their designs. Only the non-functional features of designs are eligible for these rights.

We understand that product design is much more complicated than this. For example, as we discuss below, some design features are simultaneously both functional and non-functional.[71] In addition, we

[70] Some features of a given product might be entirely irrelevant to its design either functionally or non-functionally. We exclude them here for simplicity. But our unit of measure, here and throughout this Article, is the product as a whole.

[71] See infra notes 78–79.

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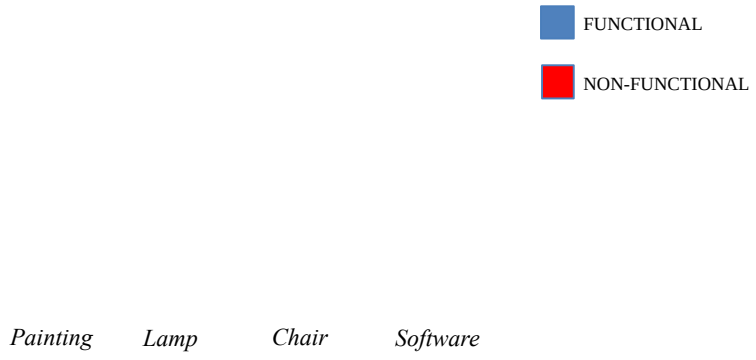
understand that "functional" can mean different things in different legal regimes. We discuss all these complications below. For now, accept that products can have a mix of features, some of which facilitate the operation or intrinsic value of the product and others of which do not. We call the former features "functional" and the latter "non-functional."

In the figure below, we represent the share of a product's total features that are non-functional in red and the share of a product's total features that are functional in blue.

Figure 1: Non-Functional and Functional Ratios in Different Products



At this point, our model treats each feature of a product's design as either functional or non-functional. Of course, some features of a product incorporate both functional and non-functional aspects. A lamp will likely have certain dimensions determined by functional considerations, yet it might also incorporate sculptural elements in its base. For now, our model imagines that for any given product these different aspects can be distinguished. Thus, any given product will incorporate a percentage of functional features and an inverse percentage of non-functional features. The sum of these percentages must add to 100%. For example, almost all of the features of an artistic painting will be non-functional, and very few of them will be functional. By contrast, the vast majority of the features of software are functional, while almost none, if any, are non-functional. The non-

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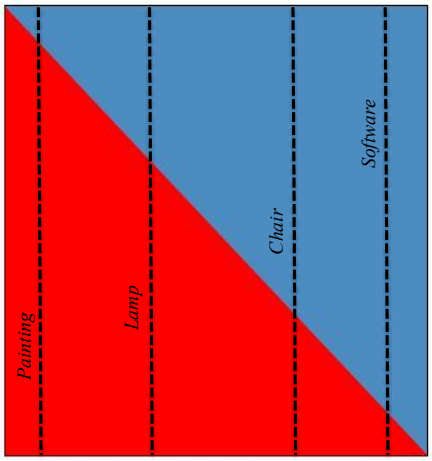
functional/functional ratios for lamps or chairs fall somewhere in between these. Later in the Article, we will relax that assumption and consider the problem of products that have both functional and non-functional elements that cannot be separated.

Now imagine that we line up, side by side, depictions of the non-functional/functional ratios of many creations, starting on the left with the products that have the highest percentage of non-functional content (and lowest functional content) and ending on the right with products that have the lowest percentage of non-functional content (and highest functional content). Figure 2 illustrates the model.

Figure 2: A Simple Model of Product Design Features



Product Types

The y-axis on the left side of Figure 2 represents the percentage of non-functional features in a given product, and the y-axis on the right side is simply the inverse percentage of functional features in the same product since both of these percentages must add up to 100%. Along the x-axis, we have arranged products based on their mix of non-functional versus functional features. Products like paintings, novels, and

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sculptures will fall on the left side of the axis,[72] while products like cars and consumer electronics will be in the middle. On the right side are products like software.

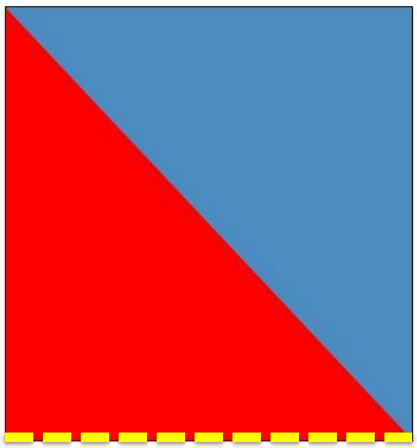
Using this simplified model of product design, we now illustrate the three basic different functionality screens in IP law: Exclusion, Filtering, and Thresholds. To do so, we will use the depiction of multiple products arranged as in Figure 2. On top of that depiction, we will superimpose a dashed yellow line that indicates the nature of the protection afforded to products by each of the functionality screens.

To use the figures, first locate a given product along the x-axis according to its functional/non-functional ratio. Then look at the dashed yellow line to determine which, if any, features of the product will receive protection. All of the non-functional features (red) that fall below the yellow line are protected by the screen.

A. Exclusion

We call the first category of functionality screening methods Exclusion. As its name suggests, when this screening mechanism applies, a given category of works, designs, or marks is completely excluded from receiving non-utility-patent protection. Importantly, as with the other screens, when Exclusion applies, it applies to a whole category of works, designs, or marks. Any claimed design falling within that category is automatically excluded from IP protection regardless of how much non-functional content it contains. With an Exclusion screen, a product, work, or good receives no protection whatsoever even though it incorporates non-functional features. This is the case even when the product incorporates significant aesthetic or expressive content. We represent the Exclusion screen in Figure 3.

Figure 3: Exclusion



[72] To be clear, o ent their aesthetic quality as a matter degree to which a design contains non , while a painting by Picasso might h this Article, both paintings would like

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The yellow dashed line represents the level of protection, which is here set at zero for all products. Applying the Exclusion screen is, of course, incredibly easy for a decisionmaker. Once the decisionmaker determines that Exclusion applies, no aspects of the product receive protection. No effort need be made to isolate the product's non-functional and functional features. It simply does not receive protection.

As a practical matter, the graph may not perfectly reflect reality. We don't normally exclude protection altogether for expressive works that have a high percentage of non-functional content. So while in theory even a work that had 100% non-functional content would get no protection under an Exclusion rule, these days Exclusion is likely to be the rule only for works that tend to have a high percentage of functional content.[73]

B. Filtering

When IP regimes must screen out the functional features of a product, work, or good from its non-functional features they often engage in what we call Filtering. Filtering, as its name suggests, involves isolating the non-functional features of a product from its functional features. The relevant decisionmaker (whether court, jury, or examiner) determines which aspects of the product are non-functional and which are functional.[74] Then, the functional aspects of the product are filtered out, leaving only the non-functional features. The remaining non-functional features, and only those features, are then eligible for protection.

Filtering typically results in the creation of a valid right and in protection for the full range of otherwise protectable non-functional features of the product. For example, in copyright law, once the functional features of a work have been stripped away, all of the remaining aesthetic or expressive features that are original and at least

[73] That wasn't always true. When copyright law was limited to books, maps, and charts, it effectively excluded from protection altogether works like paintings that had a high percentage of expressive content. But copyright didn't do so in order to prevent protecting functional works. It simply hadn't been extended to other creative works analogous to "writings." IPNTA, supra note 38, at IV-6.

[74] For now, we set aside issues of how and when this filtering is supposed to take place. We return to this issue in Part IV.

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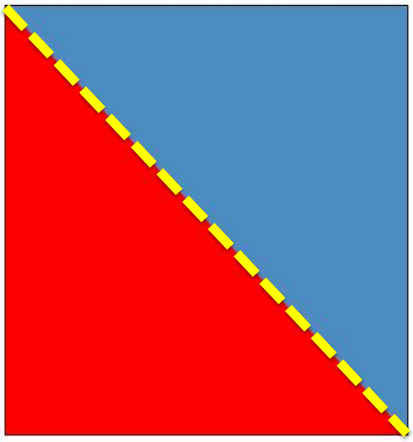
minimally creative will receive copyright protection.[75] We illustrate this approach in Figure 4. Here, the line between blue and red represents the same curve of non-functional and functional features that we used in Figure 2. The dashed yellow line represents the level of non-utility patent protection that is given to a product falling anywhere along the line.

Figure 4: Filtering



In Filtering, the non-functional/functional curve and the protection curve are identical. This means that if Filtering is performed correctly, each of the protectable non-functional features of a given product receives protection, and the scope of that protection extends to the full range of those non-functional features but no further.[76] For example, a product that incorporated 90% non-functional features and 10% functional features would receive protection for the 90% of its features that are non-functional. And the inverse is also true. If a product incorporated only 10% non-functional features and 90% functional features, it would still obtain some level of protection, but only for the 10% of its design that is non-functional.

[75] See, e.g., Computer Assocs. Int'l v. Altai, Inc., 982 F.2d 693, 714, 721 (2d Cir. 1992).

[76] Again, assuming that they are otherwise protectable by a particular IP regime.

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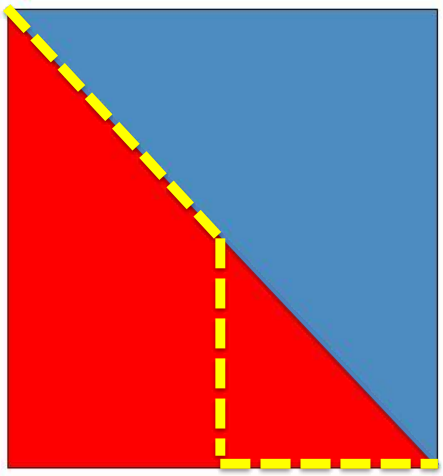
C. Thresholds

The final functionality screening mechanism, Threshold, differs from the first two because all works or designs within a regime are not treated identically. The use of a Threshold produces dichotomous treatment for works or designs falling on either side of the line. The Threshold screen operates as though it establishes a particular ratio of non-functional to functional features as a cut point—for example, 50:50. For all products with a greater ratio of non-functional to functional features (e.g. 60:40), one rule applies; for all products with a lower ratio of non-functional to functional features (e.g. 30:70), a different rule applies. The result is to create a discontinuity around a particular point. One possible Threshold approach would require a certain minimum amount of non-functional content to give any protection at all. Meet the bar and you can obtain some rights, but fall below the minimum and the law offers no protection. This form of Threshold screen mandates that once a given product incorporates too much functionality it will no longer be eligible for protection. Figure 5 illustrates this form of Threshold Screen.

Figure 5: Threshold



The Threshold screens that we discuss below do not, in fact, operate using explicit ratios of functional and non-functional features. Their key feature is, however, that at some level or degree of functionality, the law

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treats products differently from others. In fact, any form of discontinuity also counts as a form of Threshold. Courts must, for instance, deal with design elements that have inseparable functional and non-functional attributes by giving either full protection or no protection to the inseparable element. Doing so can create a discontinuity between lesser and greater protection.

Applying the Threshold screen requires the decisionmaker to determine where along the non-functional/functional curve the threshold is to be set.[77] As we will see below, this effort has proved dazzlingly complicated for courts. In actual litigation, thresholds cannot be set numerically as in the example above. Instead, the law must establish some verbal description of the relationship between non-functional and functional features that indicates where the threshold sits. Next, the decisionmaker must determine on which side of the threshold the product lies. The decisionmaker must apply the legally established threshold to a given product, sorting non-functional features from functional ones and weighing their contributions to the whole. If the product falls to the left of the threshold as depicted in Figure 5, the decisionmaker must filter out the functional features from the non-functional ones, allowing protection only for the latter. If, however, the product falls to the right of the threshold, it receives no protection whatsoever.

D. Complicating the Model: Dual-Nature Features

Our simple model of design functionality treats all design features as either functional or non-functional. But sometimes, individual features are both functional and non-functional at the same time. The shape of a Ferrari, for instance, may at the same time make the car go faster, make it attractive, and signal to the public that it is in fact a Ferrari. Particular features of a garment design might serve both the aesthetic goal of looking attractive in their own right and the functional goal of making

[77] The decisionmaker setting the initial threshold is typically Congress. Other subsequent decisionmakers, including examiners, courts, and juries, must then interpret where Congress has set the threshold.

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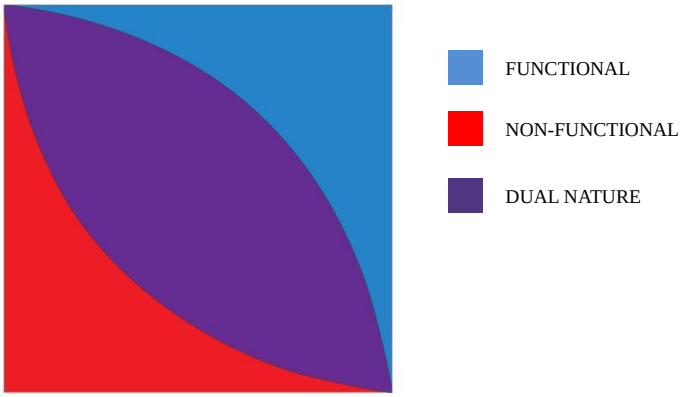
the wearer look good.[78] If those things cannot be separated—if the very same element that makes the car work better as a car also serves to identify source or represent creative design—the law must decide how to categorize these elements. We represent these dual-nature design choices in Figure 6. The features colored red represent purely non-functional aspects of the product, while those colored blue represent purely functional aspects. In the middle, however, are the blended design features colored purple that incorporate both functionality and non-functionality simultaneously.

Figure 6: Modeling Dual-Nature Features



The screens we discussed above assume that each element in a product can be classified as either non-functional or functional, so that the line between the two is a continuous one. We can relax that assumption without undermining the model. A feature that is both non-functional and functional and cannot be separated would have to be treated either as non-functional or as functional, because the law could

[78] Brief of Professors Christopher Buccafusco & Jeanne Fromer as Amici Curiae in Support of Petitioner at 4, 18–19, Star Athletica v. Varsity Brands, 137 S. Ct. 1002 (2017) (No. 15-866); Christopher Buccafusco & Jeanne C. Fromer, Fashion's Function in Intellectual Property Law, 92 Notre Dame L. Rev. 12–15 (forthcoming 2017) [hereinafter Buccafusco & Fromer, Fashion's Function], https://ssrn.com/abstract=2826201 [https://perma.cc/WQG5-P5E3].

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not treat it as both at the same time.[79] In the figure above, the law must decide whether purple features should be treated like blue purely functional features or red purely non-functional features. In cases involving dual-nature features, then, a particular legal regime must first determine *what* features it will treat as functional before it determines *how* it will screen out those functional features.

* * *

When copyright, design patent, and trademark laws screen out functional aspects of works, designs, and products they generally use one of the three mechanisms described above. These three screening mechanisms represent the basic toolbox available to prevent the unwarranted protection of functionality in non-utility-patent IP regimes.[80] In the following Parts, we demonstrate the use of these mechanisms in the different IP regimes.

III. HOW FUNCTIONALITY OPERATES IN IP DOCTRINE

In this Part, we review the nature of IP protection in each of these fields and the reasons why distinctions between them are so important.

A. Copyright Law

Copyright law is the province of authorial expression and aesthetic creativity, and it is the appropriate home for works of literature and the arts.[81] Yet since its inception in the United States, copyright law has also granted protection to works that are valued in large part due to their usefulness. The first Copyright Act, in 1790, protected only "maps,

[79] Buccafusco & Fromer, Fashion's Function, supra note 78, at 29–30.

[80] There are some legal rules that don't seem to map to any of these approaches. Design patents are a notable example. We discuss those pathological approaches below. See infra notes 225–45 and accompanying text.

[81] Michael J. Madison, Beyond Creativity: Copyright as Knowledge Law, 12 Vand. J. Ent. & Tech. L. 817, 819 (2010) ("To all outward appearances, creativity is the undisputed 'what?' of copyright."). But cf. Barton Beebe, *Bleistein*, the Problem of Aesthetic Progress, and the Making of American Copyright Law, 117 Colum. L. Rev. 319, 321 (2017) (questioning the historical pedigree of applying the constitutional protection for "Science and useful Arts" to fine art).

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charts, and books."[82] And while vintage maps adorn many people's walls, a map's principal value is to help travelers get where they are going (a particularly important value in our new, uncharted nation).[83] But while copyright protection is available for works that have utility, the legal doctrine should only protect the aspects of those works that are expressive or aesthetic. Copyright law needs a mechanism to distinguish the creative aspects of, say, a map that the law protects from the functional aspects it does not protect.

As we demonstrate below, copyright law employs all three of the functionality screens—Filtering, Thresholds, and Exclusion—to prevent granting rights to inappropriate aspects of works. Importantly, which screen applies depends on the kind of work that the author claims to have created. As a general matter, many kinds of works are simply excluded from copyright entirely. Of the works that are included, literary works are subject to Filtering. With the Supreme Court's recent decision in *Star Athletica v. Varsity Brands*, copyright law's treatment of pictorial, graphic, and sculptural works is in flux. As far as we can tell, however, there has been little systematic thought about why different classes of works receive different kinds of treatment. In the following Sections, we explain when and how each of the screens applies.

1. Literary and Other Works Subjected to Filtering Screens

Works of literature are not typically thought of as being useful. Reading literature might teach people important moral lessons,[84] but no one would think that didactic value of Evelyn Waugh's *Brideshead Revisited* should disqualify it from copyright protection. Many literary works, however, do involve the sorts of usefulness and functionality that are inappropriate for copyright.[85] Some books teach how to perform

[82] See Act of May 31, 1790, ch. 15, 1 Stat. 124, 124–25 (entitled "An Act for the encouragement of learning") (repealed 1802).

[83] Even the books that were most frequently registered in the early republic were of the useful variety—textbooks, manuals, atlases, and directories. See James Gilreath, American Literature, Public Policy, and the Copyright Laws Before 1800, *in* Federal Copyright Records 1790-1800, at xv, xxii (James Gilreath ed., Elizabeth Carter Willis comp., 1987).

[84] See Martha C. Nussbaum, Love's Knowledge: Essays on Philosophy and Literature 261–62 (1990).

[85] Pamela Samuelson, Functional Compilations, 54 Hous. L. Rev. 321, 321 (2016).

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statistical analysis, for example, or explain a new system of accounting.[86] Other literary works, such as taxonomies and codes, enable users to accomplish certain useful tasks.[87] And computer software, which copyright law treats as a literary work, is written to instruct the functioning of machines.[88] In all of these cases, allowing the authors of the literary works to also gain protection for the functional features of their works would conflate copyright and patent law, and it would upset the corresponding balances that the two regimes enact.

These concerns arose most famously in the 1879 case *Baker v. Selden*.[89] Charles Selden published a book describing a "peculiar system of book-keeping" that he developed.[90] The book included an introductory essay explaining the system and a set of forms showing how the system should be performed. Baker, a competitor, published a different set of forms in his own book, which described a system very similar to Selden's. The Supreme Court had to determine whether Selden's copyright in his book also conveyed the exclusive right to the use of the bookkeeping system.[91]

The Court distinguished between the book "as the work of an author, conveying information on the subject" and the system or art which it is intended to illustrate.[92] According to the Court, "The copyright of the book, if not pirated from other works, would be valid without regard to the novelty, or want of novelty, of its subject-matter."[93] That is, the expression in the work could receive a copyright if it were merely original to the author. The bookkeeping system, by contrast, was the province of patent law: "The claim to an invention or discovery of an art or manufacture must be subjected to the examination of the Patent

[86] Baker v. Selden, 101 U.S. 99, 100 (1879).

[87] Samuelson, supra note 85, at 359.

[88] 17 U.S.C. § 101 (2012) ("A 'computer program' is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.").

[89] 101 U.S. at 102.

[90] Id. at 100.

[91] Id. at 101 ("[T]he question is, whether the exclusive property in a system of book-keeping can be claimed, under the law of copyright, by means of a book in which that system is explained?").

[92] Id. at 102.

[93] Id.

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Office before an exclusive right therein can be obtained . . . ."[94] This examination would feature a determination of whether the invention was truly novel, and in Selden's case, it had not taken place.[95]

Importantly, the useful character of Selden's book did not vitiate his copyright entirely. Selden retained a copyright in the book as a whole for purposes of explaining the system it described. Yet, the copyright in the book would not enable him to prevent others from using the system, which, in this case also meant using the forms in the book.[96] As the Court explained, "[W]hilst no one has a right to print or publish his book, or any material part thereof, as a book intended to convey instruction in the art, any person may practise and use the art itself which he has described and illustrated therein."[97] The Court, in effect, filtered out the unprotectable aspects of Selden's book, leaving him with a copyright in the remaining, expressive elements of the work.

The current Copyright Act embraces *Baker*'s filtering approach. Section 102(a) establishes a list of protectable categories of original authorship.[98] This is followed by Section 102(b), which states: "In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work."[99] According to most courts and scholars, one of the principal purposes of Section 102(b) is to exclude from copyright law those aspects of works that fall within the province of patent law—procedures, processes, systems, and methods of

[94] Id.

[95] It is unlikely that Selden's system would have then fit the appropriate subject matter for patentability, because it would not have been deemed a machine or manufacture. Patent law excludes "printed matter" from the scope of protection. Application of Chatfield, 545 F.2d 152, 157 (C.C.P.A. 1976). So the Court's suggestion in *Baker* that Selden should have looked to patent law instead was somewhat disingenuous. A more accurate statement would be that his system of accounting could be protected, *if at all*, under patent rather than copyright law.

[96] *Baker*, 101 U.S. at 103 ("[W]here the art it teaches cannot be used without employing the methods and diagrams used to illustrate the book, . . . such methods and diagrams are to be considered as necessary incidents to the art, and given therewith to the public . . . .").

[97] Id. at 104.

[98] 17 U.S.C. § 102(a) (2012).

[99] Id. § 102(b).

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operation.[100] As in *Baker*, when an original authorial work also describes, illustrates, or enacts functional processes, systems, or methods, the copyright in the work remains, but it does not extend protection to those processes, systems, or methods. Accordingly, the role of a court faced with a work that incorporates, describes, or enacts some function is to construe the scope of the author's copyright such that it protects only her original expression and none of its functional character.[101]

For literary works, virtually any amount of original expression will suffice to validate an author's copyright in that expression. For instance, even in *Feist Publications v. Rural Telephone Service Co.*, in which the court held that an alphabetical listing of names and telephone numbers was not original and could not be protected,[102] the Court nonetheless emphasized that Rural Telephone's white pages directory as a whole was entitled to copyright protection because it had (minimal) written front matter in addition to the list of phone numbers.[103]

Computer software is a prime example of the role of Filtering in copyright. While the law treats computer code as a literary work—it is literally written, albeit in a specialized language—software is almost entirely functional.[104] It exists, as the definition in the Copyright Act indicates, to give a computer a set of instructions to bring about a certain result.[105] As Pamela Samuelson has repeatedly pointed out, no one buys software for the expression contained within the code; the value of a computer program is its function.[106] The code's functional components,

[100] See, e.g., Samuelson, Why Copyright Law Excludes, supra note 23, at 1921–22. Section 102(b)'s other purpose is to establish the so-called idea/expression distinction.

[101] Lemley & McKenna, supra note 63, at 2226–28.

[102] 499 U.S. 340, 363 (1991).

[103] Id. at 361.

[104] Pamela Samuelson, Randall Davis, Mitchell D. Kapor & J.H. Reichman, A Manifesto Concerning the Legal Protection of Computer Programs, 94 Colum. L. Rev. 2308, 2317 (1994) ("No one would want to buy a program that did not behave, i.e., that did nothing, no matter how elegant the source code 'prose' expressing that nothing.").

[105] 17 U.S.C. § 101 (2012) ("A 'computer program' is a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result.").

[106] Samuelson et al., supra note 104, at 2317.

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however, are not protectable, so courts must screen them out and focus only on the remaining expression.[107]

To screen function from expression in computer code, most courts apply the "abstraction-filtration-comparison" test initially applied to software by the Second Circuit in *Computer Associates International v. Altai, Inc*.[108] Following *Baker*, the court ruled that the processes generated by the program and the elements of the program necessary to bring them about are unprotectable.[109] Any similarity between these aspects of the plaintiff's code and the defendant's code would thus not amount to copyright infringement. To determine liability, then:

> [A] court would first break down the allegedly infringed program into its constituent structural parts. Then, by examining each of these parts for such things as incorporated ideas, expression that is necessarily incidental to those ideas, and elements that are taken from the public domain, a court would then be able to sift out all non-protectable material. Left with a kernel, or possible kernels, of creative expression after following this process of elimination, the court's last step would be to compare this material with the structure of an allegedly infringing program.[110]

This process, and in particular the middle sifting step, allows functional, and thus unprotectable,[111] aspects of the program to run through the sieve, leaving whatever copyright expression exists to remain. As the court explains, "[T]his filtration serves the purpose of defining the scope of plaintiff's copyright."[112]

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[107] Id. at 2350.

[108] 982 F.2d 693, 706 (2d Cir. 1992).

[109] Id. at 704–05.

[110] Id. at 706.

[111] The filtration stage also removes unprotectable but non-functional aspects of the code including unoriginal aspects or features dictated by external factors.

[112] *Computer Assocs. Int'l*, 982 F.2d at 707 (internal quotation marks omitted) (quoting Brown Bag Software v. Symantec Corp., 960 F.2d 1465, 1475–76 (9th Cir. 1992)). This abstraction-filtration-comparison approach has become the standard way to analyze software copyrights in almost all circuits. See Mark A. Lemley, Convergence in the Law of Software Copyright?, 10 High Tech. L.J. 1, 2–3 (1995). The Third Circuit is the sole holdout. Whelan Assocs. v. Jaslow Dental Lab., 797 F.2d 1222, 1238–39 (3d Cir. 1986).

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Notice that the court does not expect much copyrightable expression to be left after the filtration analysis. It refers to it as merely a "kernel," and suggests that it may not exist at all. Yet because copyright uses filtering for literary works, even the smallest kernel of expression will often support a copyright. As a practical matter, that small kernel of expression can be important, because it allows the copyright owner to preclude exact copies of the work even if the vast majority of the work is functional rather than expressive. But copyright owners often want more, as Computer Associates did—the ability to prevent the creation of other programs that work in similar ways.[113]

Similarly, just because a program or device covers a "method" or "system" does not mean that it will automatically be excluded from protection. The law here is not entirely clear, and there may be variability between the federal circuit courts. In the recent litigation between Oracle and Google over the copyrightability of the Java application program interface, Oracle's description of the code as a method did not defeat its copyright claim.[114] In supporting Oracle's copyright, the Federal Circuit cited a number of cases upholding copyrights in works described as methods.[115] It held, "Section 102(b) does not . . . automatically deny copyright protection to elements of a computer program that are functional. . . . Therefore, even if an element directs a computer to perform operations, the court must nevertheless determine whether it contains any separable expression entitled to protection."[116] As long as the author made some choices that were not entirely dictated by the program's functionality, those choices were

[113] For a discussion of how to apply the abstraction-filtration-comparison test to distinguish function from expression, see Pamela Samuelson, Functionality and Expression in Computer Programs: Refining the Tests for Software Copyright Infringement, 31 Berkeley Tech L.J. 1215, 1223–31 (2017).

[114] Oracle Am. v. Google Inc., 750 F.3d 1339, 1363 (Fed. Cir. 2014). The court noted that "Sun called the code for a specific operation (function) a 'method.'" Id. at 1349.

[115] Id. at 1366; see, e.g., Mitel, Inc. v. Iqtel, Inc., 124 F.3d 1366, 1372 (10th Cir. 1997) ("We conclude that although an element of a work may be characterized as a method of operation, that element may nevertheless contain expression that is eligible for copyright protection. Section 102(b) does not extinguish the protection accorded a particular expression of an idea merely because that expression is embodied in a method of operation at a higher level of abstraction.").

[116] *Oracle*, 750 F.3d at 1367.

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entitled to copyright protection. Although almost all of the purpose and value of the software were directed towards efficiency and functionality, the court would still uphold Oracle's copyright if it could find any meaningful expression.[117]

While the result in *Oracle America v. Google Inc.* is likely factually and legally incorrect, this approach to screening function in literary works is consistent across a broad range of subject matter beyond computer software, and it almost always results in the court finding that the plaintiff has a valid copyright in at least some aspect of the work—though often not a right as broad as the plaintiff claims. In *CCC Information Services v. Maclean Hunter Market Reports*, the Second Circuit upheld the plaintiff's copyright in an automotive pricing guide even though it recognized that the plaintiff's decisions were motivated almost entirely by the guide's utility.[118] *Southco, Inc. v. Kanebridge Corp.*, involving a machine parts numbering system, is the rare case in which a court, in an opinion by then-Judge Samuel Alito, ruled that the plaintiff's efforts were "purely functional" and, thus, unprotectable.[119]

Filtering is the standard functionality screen for literary works, and, as we have shown, it almost always results in courts finding that plaintiffs have valid copyrights in at least some aspects of their works. The Filtering screen ostensibly removes the functional and utilitarian aspects of literary works from the scope of the copyrights, leaving authors with

[117] We are dubious the court got the functionality question right in *Oracle*. It definitely set itself at odds with other cases. In contrast, in *Lotus Development Corp. v. Borland International*, the First Circuit held that the system of operation could not be copyrighted at all, even though there were other ways of implementing the same function. 49 F.3d 807, 821 (1st Cir. 1995). Even in that case, however, the result was not that Lotus 1-2-3 got no copyright protection at all in the computer program, merely that the copyright could not extend to the system of operation. Id. at 816. For trenchant criticism of *Oracle*, see, for example, Samuelson, Strategies for Discerning, supra note 23, at 1513, and Peter S. Menell, Rise of the API Copyright Dead?: An Updated Epitaph for Copyright Protection of Network and Functional Features of Computer Software (Univ. Cal. Berkeley Pub. Law Research Paper No. 2893192, 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2893192 [https://perma.cc/WWD9-WM3Q].

[118] 44 F.3d 61, 70, 74 (2d Cir. 1994) ("It is apparent that virtually any independent creation of the compiler as to selection, coordination, or arrangement will be designed to add to the usefulness or desirability of his compendium for targeted groups of potential customers, and will represent an idea.").

[119] 390 F.3d 276, 284–85 (3d Cir. 2004).

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protection for any remaining expressive features of their works. So even though a work may be 95% functional and only 5% expressive,[120] the expressive portion is still entitled to copyright. Importantly, when applying the Filtering screen, courts are not concerned with whether a work is "primarily" functional or expressive. Doing so imports a threshold-based screen where one is not called for.[121]

Done correctly, Filtering can significantly narrow the effective scope of copyright for works that are primarily functional in nature while allowing protection for those works' expressive elements. But it is important that courts actually engage in filtering out the unprotectable elements. Some courts have applied vague concepts like "look and feel" to allow copyright plaintiffs to wave their hands over just what was protectable about their works.[122] Filtering properly requires more. It requires courts to identify and decline protection for the functional elements of expressive works. Doing that in turn may require the parties to specify the particular elements that are expressive in a work that is also functional.[123]

Copyright law does not just apply Filtering to literary works. Filtering is the default screen for copyrightable subject matter, applicable to other kinds of works such as plays or movies.[124] The next Subsection illustrates how pictorial, graphic, and sculptural ("PGS") works are subject to Thresholds, and the following Subsection explains how some classes of works are simply excluded from protection entirely. But if a work is classified in Section 102(a) as a protectable subject matter, and if it is not explicitly subject to a functionality threshold as PGS works

[120] For an example, see the placement of computer software on the graph in Figure 2 supra.

[121] See, e.g., Bikram's Yoga Coll. of India v. Evolation Yoga, 803 F.3d 1032, 1040 (9th Cir. 2015) (apparently applying a functionality threshold to yoga, noting that it "primarily reflects function, not expression").

[122] Roth Greeting Cards v. United Card Co., 429 F.2d 1106, 1110 (9th Cir. 1970).

[123] Some courts have required something similar in trade dress cases. See, e.g., Yurman Design v. PAJ, Inc., 262 F.3d 101, 116–17 (2d Cir. 2001); Landscape Forms v. Columbia Cascade Co., 113 F.3d 373, 380–81 (2d Cir. 1997).

[124] Samuelson has helpfully categorized the various ways copyrightable compilations can be functional, and the various types of works that face functionality issues in copyright outside of PGS works. Samuelson, Functional Compilations, supra note 85, at 321–22.

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are, then courts should apply Filtering.[125] As we explain below, architectural works are now subject to Filtering.[126] The same should be true for choreographic works that incorporate some degree of functionality, such as improving health or muscle tone.[127] And if a musical composition or sound recording were partially functional—for example, if the specific notes or sounds operated a machine—then a court should filter out those features and grant protection to any remaining original expression.

Copyright filtering does contain an important variation on the Filtering screen that merits discussion. The "merger doctrine" holds that, in certain circumstances, where authors have only one or very few ways of expressing an idea or function, the expression and the idea are merged, and the expression is treated as unprotectable.[128] The merger doctrine recognizes that circumstances may arise in which authors are constrained by functionality or efficiency to a highly circumscribed set of locutions. Granting copyright to the first author to articulate those expressions would have the effect of giving her an exclusive right to the function itself. Accordingly, courts have refused to extend copyright to instructions for hanging draperies,[129] the rules of games,[130] directions to locksmiths for cutting keys,[131] and, in a sense, the forms in *Baker* where their reproduction was a "necessary incident" to the use of the system.[132]

[125] We have not been able to locate any cases involving functionality screening for a number of the categories of copyrightable works in § 102(a), including musical works, dramatic works, pantomimes, motion pictures and audio visual works, and sound recordings. It is certainly possible to imagine that some of these categories, including musical works and sound recordings, could involve works that are functional.

[126] See infra text accompanying notes 188–94.

[127] Christopher Buccafusco, Authorship and the Boundaries of Copyright: Ideas, Expressions, and Functions in Yoga, Choreography, and Other Works, 39 Colum. J.L. & Arts 421, 429 (2016).

[128] See Pamela Samuelson, Reconceptualizing Copyright's Merger Doctrine, 63 J. Copyright Soc'y U.S.A. 417, 417 (2016).

[129] Decorative Aides Corp. v. Staple Sewing Aides Corp., 497 F. Supp. 154, 156–57 (S.D.N.Y. 1980).

[130] Landsberg v. Scrabble Crossword Game Players, 736 F.2d 485 (9th Cir. 1984) (game strategy handbook).

[131] Continental Micro v. HPC, Inc., No. 95 C 3829, 1997 WL 309028, at *1–2 (N.D. Ill. June 4, 1997).

[132] 101 U.S. at 103.

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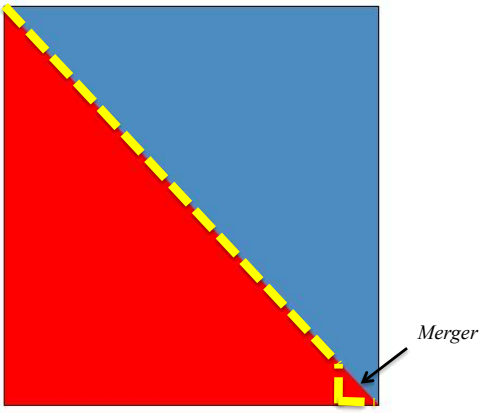
The merger doctrine, then, is a slight variation of the general Filtering screen that copyright law applies to literary works. In effect, the merger doctrine indicates that once the degree of functionality gets so high and the degree of expression gets so low that subsequent authors will not meaningfully be able to avoid copyright infringement to achieve a function, copyright protection ceases. Copyright law's functionality screen for literary works, then, appears to operate as a Threshold with the threshold placed to the far right extreme of our model.

Figure 7: Merger Doctrine



Once a work passes the point where the expressive opportunities are so limited that copyright protection would amount to de facto protection for function or efficiency, a work is simply unprotected. A more difficult case is posed by works that seem to fit into a broad protectable category but that are themselves highly functionally constrained. Consider, for instance, telephone white pages (a literary work but highly functional), or a series of yoga poses (arguably a choreographic work but one that

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incorporates a high degree of functionality). Courts and commentators differ over whether to exclude these constrained works from copyright altogether or to try to apply Filtering with a merger Threshold.[133]

2. PGS Works, the Useful Articles Doctrine, and Functionality Thresholds

Copyright law also confronts functionality in the context of industrial design and applied art, but its approach to screening out unwarranted claims here differs from the Filtering approach used for literary works. Historically, works that fall into the category of pictorial, graphic, or sculptural works were instead subjected to a complex Threshold regime to determine their validity.[134] This regime, known as the "useful articles" doctrine, has been substantially upended by the Supreme Court's holding in *Star Athletica*.[135]

a. The Useful Articles Threshold Before Star Athletica

In the 1954 case of *Mazer v. Stein*, the Supreme Court upheld the copyright in a lamp base that incorporated a sculpture of a dancing woman.[136] Although the lamp base had features that might have made it more appropriate for either utility patent or design patent protection, the Court ruled that Congress was not forbidden from granting copyright protection to the "work of art" that was included in the object. The Court found a "contemporaneous and long-continued construction" of copyright statutes allowing protection for articles having some utilitarian use.[137] Copyright under the then-pertinent regulation extended to "works of artistic craftsmanship, in so far as their form but not their mechanical

[133] See Bikram's Yoga Coll. of India v. Evolation Yoga, 803 F.3d 1032, 1040 (9th Cir. 2015) (applying a functionality threshold to yoga, noting that it "primarily reflects function, not expression"). But see Buccafusco, supra note 127, at 424 (arguing that yoga poses should not be protected because they are not statutorily choreographic works).

[134] See, e.g., Brandir Int'l v. Cascade Pac. Lumber Co., 834 F.2d 1142, 1145 (2d Cir. 1987).

[135] 137 S. Ct. at 1016. We discuss *Star Athletica* in detail below.

[136] 347 U.S. 201, 217–18 (1954).

[137] Id. at 213–14.

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or utilitarian aspects are concerned."[138] Implied in this regulation was the rule that objects that did not qualify as "works of artistic craftsmanship" could not obtain any copyright, regardless of their expressiveness. Whether a work was one of artistic craftsmanship, then, operated as a threshold for copyrightability. Below this threshold, no protection was available, but works that cleared it were protected according to their degree of expressiveness using the Filtering screen.[139]

The 1976 Copyright Act modified but mostly continued the law's approach to these issues. Rather than protecting "all of the writings of an author," as the prior act did,[140] the 1976 Act created specific categories of protected subject matter. Among these are "pictorial, graphic, and sculptural works."[141] The statutory definition explains:

> Such works shall include works of artistic craftsmanship insofar as their form but not their mechanical or utilitarian aspects are concerned; the design of a useful article, as defined in this section, shall be considered a pictorial, graphic, or sculptural work only if, and only to the extent that, such design incorporates pictorial, graphic, or sculptural features that can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article.[142]

The first clause explains that, as before, works of artistic craftsmanship are copyrightable with regard to their form—that is, their degree of expressive authorship—but that their mechanical or utilitarian features must be filtered out of their scope.[143] The second clause, however, added a new wrinkle. According to the House Report on the 1976 Act, the second clause seeks "to draw as clear a line as possible between

[138] Id. at 212 (quoting 37 C.F.R. § 202.8 (1949)).

[139] See, e.g., id. at 213–14.

[140] Copyright Act of March 4, 1909, ch. 320, 35 Stat. 1075, 1076.

[141] 17 U.S.C. § 102(a)(5) (1976).

[142] Id. § 101 (2012).

[143] The House Report refers to this as "classic language." H.R. Rep. No. 94-1476, at 54–55 (1976), *as reprinted in* 1976 U.S.C.C.A.N. 5659, 5667–68.

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copyrightable works of applied art and uncopyrighted works of industrial design."[144]

Thus, if a PGS work qualifies as a "useful article" it should receive different treatment as a matter of copyright validity. The work will be subjected to a determination of whether its aesthetic features "can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article."[145] This has become known as the separability criterion. The separability doctrine is designed to deal with functional-aesthetic hybrids in which the same element both serves a functional purpose and is expressive. As noted above, when the same element is both functional and non-functional the law cannot separate the two and protect only the element's expressiveness.[146] The law must decide to protect the element despite its functionality or refuse to protect it despite its expressiveness. Copyright law typically denied protection to the dual-nature features of PGS works in such circumstances.[147]

Traditionally, courts and scholars have understood that the first step in dealing with the copyrightability of a PGS work involves determining whether the work is a useful article,[148] which the Copyright Act defines as "an article having an intrinsic utilitarian function that is not merely to portray the appearance of the article or to convey information."[149] Many PGS works will have no intrinsic utilitarian function. Although a painting may serve to cover a hole in the wall or a sculpture may offer shade from the sun, we would not treat them as being intrinsically utilitarian. These works are not useful articles, are protectable to the extent that they are original, and, yet, any residual functional aspects of the works will not receive protection. If, however, the work does have an intrinsic utilitarian function, then it constitutes a useful article. For example, clothing garments, automobiles, personal electronics, and furniture all have some significant usefulness.

[144] Id. at 5668.

[145] 17 U.S.C. § 101.

[146] See supra notes 78–79 and accompanying text.

[147] See, e.g., Brandir Int'l v. Cascade Pac. Lumber Co., 834 F.2d 1142, 1145 (2d Cir. 1987).

[148] See, e.g., Chosun Int'l v. Chrisha Creations, Ltd., 413 F.3d 324, 329–30 (2d Cir. 2005) (finding a factual dispute over whether a Halloween costume was a useful article).

[149] 17 U.S.C. § 101.

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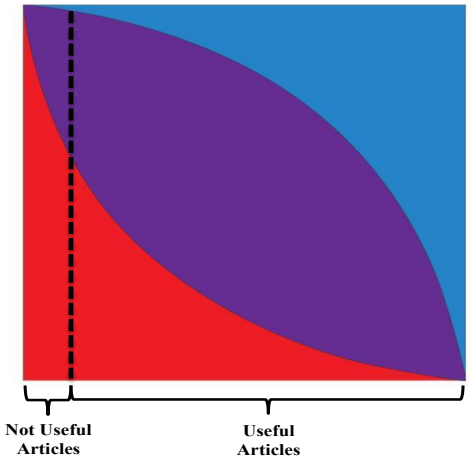
Using our model, non-useful articles occupy the narrow portion of the range to the left of the dashed black line in Figure 8, while useful articles fall along the larger remainder of the range to the right of the black line. This dashed line indicates the chief discontinuity established by the useful articles Threshold screen.

Figure 8: Useful Articles



Works falling to the left of the dashed line are not useful articles, and they are protected by a Filtering regime. The purely expressive features of a painting or drawing are protected, as are any dual-nature features of the work, but its purely functional features, including its ability to cover holes in the wall, are screened.

If a work falls to the right of the line and constitutes a useful article, the next step of the analysis has been to apply the separability criterion. As noted above, this requires the court to determine whether pictorial, graphic, or sculptural features of the work can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article. Thus, the court must determine which parts of the work are purely aesthetic features, which parts are purely utilitarian aspects, and which parts are dual-nature, those that simultaneously exhibit aesthetics and functionality. Although the nature of this inquiry is not entirely clear, the best reading of the statute treats as "utilitarian aspects"

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any components of the work that do not "merely . . . portray the appearance of the article or . . . convey information."[150]

Having analyzed the components of the work, the court can now apply the separability criterion by asking whether the aesthetic features can be identified separately from, and are capable of existing independently of, the utilitarian aspects of the article. That is, the court will ask whether the useful article exhibits any purely aesthetic features. These features, and only these features, can receive copyright protection. In some cases, this inquiry is easy, because the aesthetic features can be physically removed from the useful article. For example, the sculpted hood ornament on a Jaguar automobile can simply be removed from the car[151] leaving both a sculpture and a car. Here, the aesthetic features are said to be "physically separable."[152]

In other cases, however, the aesthetic features cannot be removed from an article. Nonetheless, courts typically hold that the aesthetic features of useful articles may still be copyrightable if they are "conceptual[ly] separable."[153] Here, in particular, courts and scholars have struggled to understand how to make this determination. Although different formulations for the conceptual separability criterion exist, they all tend to ask a similar question: is the work (or its separable features) primarily aesthetic or utilitarian?[154]

We believe that the Copyright Act is best understood as altering the nature of functionality screening for useful articles compared to non-useful articles. For useful articles, any features of a work that are either purely functional or that are dual-nature are screened from protection. A useful article should only receive copyright protection if and to the

[150] Id. (defining "useful article"); Buccafusco & Fromer, Fashion's Function, supra note 78, at 39.

[151] Too simply, if you're not careful.

[152] *Star Athletica*, 137 S. Ct. at 1014 (emphasis omitted).

[153] Id. (emphasis omitted).

[154] See Pivot Point Int'l v. Charlene Prods., 372 F.3d 913, 932 (7th Cir. 2004) (facial detail on mannequin was conceptually separable from the mannequin itself); Brandir Int'l v. Cascade Pac. Lumber Co., 834 F.2d 1142, 1147 (2d Cir. 1987) (asking whether the design of a useful article is "as much the result of utilitarian pressures as aesthetic choices"); Jacqueline Lefebvre, The Need for "Supreme" Clarity: Clothing, Copyright, and Conceptual Separability, 27 Fordham Intell. Prop. Media, & Ent. L.J. 143, 147–48 (2016).

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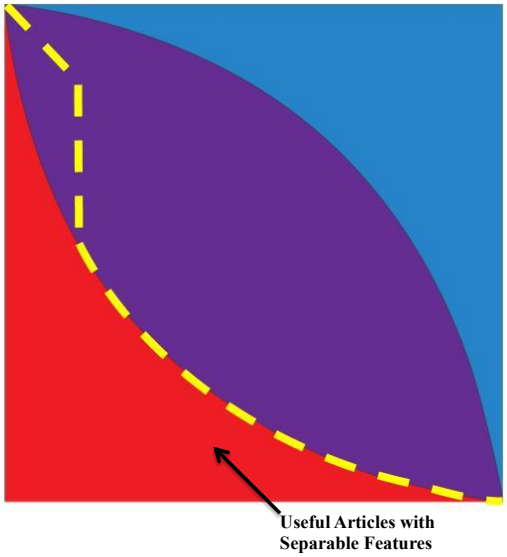
extent that it contains purely non-functional features.[155] We demonstrate this graphically below.

Figure 9: Traditional Useful Article Screening



Cases from the federal appellate courts in the decades since the adoption of the 1976 Act support this reading. In *Carol Barnhart Inc. v. Economy Cover Corp.*, the court concluded that department store mannequin torsos were unprotectable, not because there was no artistry that went into their design, but because the mannequins' features were inevitably bound up in their functional purpose of displaying garments.[156] So too in *Brandir International v. Cascade Pacific Lumber Co.*, where the court denied copyright protection to an aesthetically pleasing, award-winning bicycle rack because, although its shape may have been beautiful, it was also related to its ability to successfully hold

[155] See Buccafusco & Fromer, Fashion's Function, supra note 78, at 12; Giovanna Marchese, A Tri-Partite Classification Scheme to Clarify Conceptual Separability in the Context of Clothing Design, 38 Cardozo L. Rev. 375, 412 (2016).

[156] 773 F.2d 411, 419 (2d Cir. 1985).

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and protect bicycles.[157] Protection was appropriate in *Kieselstein-Cord v. Accessories by Pearl*, however, because certain features of the plaintiff's decorative belt buckles played no part whatsoever in their function. Certain aspects of their shape were merely aesthetic.[158]

b. Functionality Screening After Star Athletica

The Supreme Court's holding in *Star Athletica* has fundamentally altered the way that copyright law screens functionality for PGS works. The case involved the copyrightability of simple designs on cheerleader uniforms, such as chevrons that emphasized the breasts and deemphasized the waist.[159] The district court held that the designs were not copyrightable because they were inseparably functional, but the Sixth Circuit reversed. The Supreme Court agreed with the Sixth Circuit.[160] In doing so, however, the Court's opinion wreaks two major changes on the useful articles doctrine: it eliminates the threshold Congress imposed between useful and non-useful articles, and it alters the treatment of dual-nature features, which are now potentially protectable.

Figure 10: Varsity's Uniform Designs

Design 299B
Registration No. VA 1-319-226

Design 299A
Registration No. VA 1-319-228

[157] 83
[158] 63
[159] Se
[160] *Sta*

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Justice Thomas's majority opinion begins, as is appropriate, with a discussion of whether the designs are, in fact, useful articles. The actual registrations were for two-dimensional images of cheerleader uniforms. Because the designs were incorporated into a useful article, however, he determines that the designs are useful articles and that separability analysis is appropriate.[161]

The test that the Court adopts for separability, however, entirely vitiates the distinction that Congress established between useful and non-useful articles. The Court notes that the copyright statute requires that features of a work must be both capable of separate identification and capable of independent existence, but its treatment of these requirements deviates dramatically from how they had been previously understood. The first requirement is satisfied if the decisionmaker looks at the article and can "spot some two- or three-dimensional element that appears to have pictorial, graphic, or sculptural qualities."[162] We are not told, however, how to determine whether an element has these qualities or not. Next we must ask whether these features have the capacity to exist apart from the utilitarian aspects of the article.[163] They do if they are "able to exist as [their] own pictorial, graphic, or sculptural work . . . once [they are] imagined apart from the useful article."[164] Notably, they need not be physically separable. The PGS features are protectable simply if they can be depicted in some medium other than that of a useful article.[165]

While much of the Court's opinion remains mysterious—including how to determine whether a feature is functional or not, or even whether

[161] Id. at 1009. Justice Ginsburg, in a concurring opinion, would not have subjected the designs to a separability analysis at all. Id. at 1018 (Ginsburg, J., concurring in the judgment).

[162] Id. at 1010 (majority opinion).

[163] Id. The Court notes that this requirement is "ordinarily more difficult to satisfy." Id. We assume that it means "ordinarily" in the sense that all previous cases had imposed a more rigorous standard than the one applied here. E.g., *Brandir Int'l*, 834 F.2d at 1147.

[164] *Star Athletica*, 137 S. Ct. at 1010.

[165] Id. at 1011 (explaining "[t]he ultimate separability question, then, is whether the feature for which copyright protection is claimed would have been eligible for copyright protection as a pictorial, graphic, or sculptural work had it originally been fixed in some tangible medium other than a useful article").

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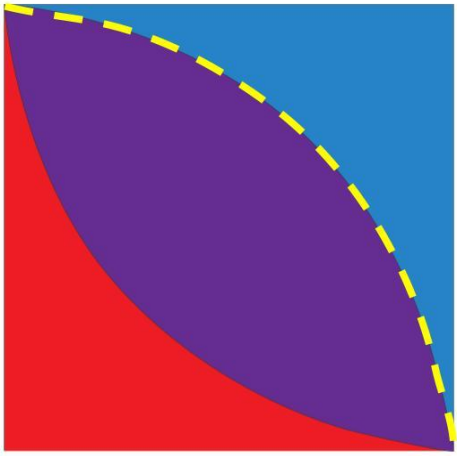
a court should engage in that inquiry at all[166]—its variation from accepted doctrine is fairly clear. For example, the Court rejected the notion that only "solely artistic features" of a useful article are protectable.[167] The Court explained that a feature could be considered separable "even if it makes [the] article more useful."[168] Once the PGS features are imagined away from the useful article, there is no requirement, according to the opinion, that what is "'left behind' . . . be a fully functioning useful article at all, much less an equally useful one."[169]

Because *Star Athletica* does not consider the language of Section 101 requiring protection only for non-functional aspects of the design, it is possible that courts will treat the new conceptual separability test only as a first step in the functionality inquiry. While virtually everything will be separable under the Court's new test, courts may—indeed, should—nonetheless filter out the functional aspects of those works in a next step, as the statute commands.

Thus, the most charitable reading of the Court's opinion is that it flips copyright law's treatment of dual-nature features of PGS works. Where previously only those features that were purely non-functional were protectable (see Figure 9), after *Star Athletica*, only those aspects that are purely functional will be filtered out. We depict this in Figure 11.

Figure 11: PGS Screening After Star Athletica



[166] Although the torial, graphic, and sculptural works," finition of "useful articles," or the por re protectable only "insofar as their f re concerned." 17 U.S.C. § 101 (2012

[167] *Star Athletica*

[168] Id.

[169] Id.

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You will notice that one aspect of this change is that it does away with the dichotomy between useful and non-useful articles that Congress had tried to create. All PGS works are now subject to the same Filtering screen—one that allows protection for both purely non-functional features as well as dual-nature features. But it would at least give some meaning to the statutory command the Court did not discuss at all.

Curiously, useful articles may now get *more* protection under *Star Athletica* than any other type of work. That was surely not what Congress intended.[170] So a second possibility for rationalizing *Star Athletica* with the rest of copyright law is that while there won't be much, if any, filtering under the conceptual separability rubric, courts can and will filter out functional elements on other grounds, like the idea-expression dichotomy and the exclusion of "processes" and "systems" under Section 102(b).[171] So we might apply a pure Filtering approach, just as we would for literary works. The practical effect of that approach may be that PGS works end up getting no less protection than any other type of copyrighted work, contrary to what Congress intended. But under this approach, at least they wouldn't get more protection.

3. Exclusion from Copyright Protection

Copyright law's use of Filtering and Thresholds are fairly clear in the fields to which they apply. Courts are explicit about their use of Filtering in computer software cases, and the Copyright Act mandates a version of a Threshold screen for PGS works.[172] Less obvious, however, is copyright law's use of Exclusion as a functionality screen. This is because the evidence for Exclusion is typically the absence of formal

[170] When Congress expanded protection for architectural works in 1990, it specifically excluded them from the category of useful articles. It made clear, though, that even though architectural works were no longer treated as useful articles, "[t]he Committee does not suggest . . . that in evaluating the copyrightability or scope of protection for architectural works, the Copyright Office or the courts should ignore functionality." H.R. Rep. No. 101-735, at 4, 20 (1990), *reprinted in* 1990 U.S.C.C.A.N. 6935, 6951. The House Report went on to define a functionality inquiry for architectural works that was presumably narrower than that for useful articles, but which now looks very much like the optimistic vision of *Star Athletica*.

[171] 17 U.S.C. § 102(b).

[172] Id. § 101.

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copyright protection for certain kinds of works. The law does not necessarily indicate that some works are excluded, but because they are not affirmatively granted protection, they are effectively excluded.

Perhaps the easiest way to illustrate Exclusion is to examine situations in which classes of works were first granted statutory protection. For example, photographs were first granted copyrights in 1865.[173] Previously, photographic creativity was simply excluded from the realm of copyright protection. The same is true of sound recordings prior to their incorporation into the law in 1972.[174] In these and other cases, the kinds of creativity that eventually received protection presumably qualified as constitutional writings of authors before their grant of federal copyright protection. But the statute did not protect them.

It is not always easy to tell what kinds of works fall between the outer boundary set by the Constitution and the inner boundary established by the Copyright Act. Culinary creativity in the form of developing original dishes is excluded from copyright protection. A written recipe may, in limited circumstances, obtain protection as a literary work, but that would not entitle the author to rights in the dish as cooked and served.[175] And some creators have claimed that prepared dishes could constitute sculptural works, but they have had no success with these claims in the courts.[176] To the extent that any rationale is offered for excluding dishes from copyright protection, it often refers to food's inherent functionality.[177] According to many who have written about food and IP,[178] creativity in the production of tastes and smells is more like patentable utility than copyrightable expression.[179] Whether true or not,

[173] Act of Mar. 3, 1865, ch. 126, § 1, 13 Stat. 540, 540.

[174] Act of Oct. 15, 1971, Pub. L. No. 92-140, 85 Stat. 391; H.R. Rep. No. 92-487, at 4 (1971), *reprinted in* 1971 U.S.C.C.A.N. 1567, 1570.

[175] Lorenzana v. S. Am. Rests. Corp., 799 F.3d 31, 34 (1st Cir. 2015) (denying copyright protection to a chicken sandwich); Publ'ns Int'l, Ltd. v. Meredith Corp., 88 F.3d 473, 482 (7th Cir. 1996).

[176] Kim Seng Co. v. J & A Imps., 810 F. Supp. 2d 1046, 1053 (C.D. Cal. 2011).

[177] Id.

[178] For a sample of this scholarship, see Christopher J. Buccafusco, On the Legal Consequences of Sauces: Should Thomas Keller's Recipes Be *Per Se* Copyrightable?, 24 Cardozo Arts & Ent. L.J. 1121 (2007); Emmanuelle Fauchart & Eric von Hippel, Norms-Based Intellectual Property Systems: The Case of French Chefs, 19 Org. Sci. 187 (2008).

[179] See *Publ'ns Int'l, Ltd.*, 88 F.3d at 480–82; *Kim Seng Co.*, 810 F. Supp. 2d at 1053.

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the effect of the Exclusion screen in copyright law is to prevent even the expressive aspects of cooking from obtaining protection. With food, the law does not filter for residual expression or assess whether the degree of expression meets a certain threshold; it simply jettisons the work from copyright protection.

The same effect applies to certain kinds of dance and bodily movement. Although the Copyright Act protects choreographic works, the legislative history explains that Congress intended to narrowly circumscribe the protection offered to only certain kinds of dances.[180] To be protectable, choreographic works are those intended to be performed for an audience.[181] Social dance steps performed by a couple are excluded.[182] So too are aspects of expressive bodily movement that do not qualify as "dance." This could include choreography designed to influence how the performer's body feels rather than how the performer's body is perceived by an external audience. For example, there might be substantial expressive creativity in the design of a yoga routine, but that creativity would not receive protection because it does not meet the statutory definition of a choreographic work.[183] As with culinary dishes, the amount of expressive creativity in a yoga sequence might be substantial (and substantially greater than in a computer program), but application of an Exclusion screen completely eliminates the opportunity for copyright protection.[184]

[180] U.S. Copyright Office, Compendium of U.S. Copyright Office Practices § 805.1 (3d ed. 2014) (noting that "[t]he legislative history for the 1976 Copyright Act clearly states that 'choreographic works' do not include social dance steps and simple routines" (quoting H.R. Rep. No. 94-1476, at 54 (1976), *reprinted in* 1976 U.S.C.C.A.N. at 5667; S. Rep. No. 94-473, at 52 (1975) (internal quotation marks omitted))).

[181] Id. § 805.2(E).

[182] Id. § 805.2(F).

[183] Buccafusco, supra note 127, at 424.

[184] The shape of clothing too has traditionally been held to be outside the subject of copyright protection, though *Star Athletica* likely changes that. Nonetheless, plaintiffs often bring copyright claims in areas that theoretically carry little or no copyright protection. Ben Depoorter finds that more than a quarter of all cases in which copyright owners sought damages were in the areas of fashion, architecture, or industrial design. Ben Depoorter, Damage Intimidation, 22 tbl.5 (2017) (unpublished manuscript) (on file with author).

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4. Coda—Architecture

We conclude our analysis of functionality screening in copyright law with an exploration of architectural copyrights. We do so because architectural creativity has been subjected to each of the three different functionality screens that we identify. Observing their operation in the same realm can, accordingly, help clarify their differences, including the important normative differences between the three regimes.

Throughout most of the history of U.S. copyright law, architectural creativity received limited protection.[185] Architectural drawings and plans were subject to copyright protection as pictorial or graphic works under the 1909 and 1976 acts, but the authors' exclusive rights only prevented others from copying their plans.[186] Copyright law did not prohibit other architects from building identical or similar buildings as long as they did not actually copy protected drawings.[187] To the extent that aspects of a building were protectable at all, they had to satisfy the conceptual separability standards discussed above.[188] While an occasional gargoyle or visual motif might receive copyright protection, the creativity involved in designing and constructing buildings did not. Decisions about the layout of rooms, for example, were uniformly treated as, at most, aesthetic choices that were inseparable from function.[189]

This situation changed with the adoption of the Architectural Works Copyright Protection Act of 1990 ("AWCPA"), which the United States enacted in order to be in compliance with the international Berne

[185] David E. Shipley, Copyright Protection for Architectural Works, 37 S.C. L. Rev. 393, 395–96 (1986).

[186] Id. at 395.

[187] David E. Shipley, The Architectural Works Copyright Protection Act at Twenty: Has Full Protection Made a Difference?, 18 J. Intell. Prop. L. 1, 22–24 (2010).

[188] Id. at 3–4.

[189] For an endorsement of this limited approach as a solution to Arrow's information paradox that did not encumber later architectural creation, see Kevin Emerson Collins, The Hidden Wisdom of Architectural Copyright Before the AWCPA: Defeasible Intellectual Property, 1–8 (Washington Univ. in St. Louis Legal Studies Research Paper No. 15-09-01, 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2655743 [https://perma.cc/P2Q5-9ZSC].

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Convention for the Protection of Literary and Artistic Works.[190] The Act added the category of "architectural works" to Section 102(a), granting authors protection for their original buildings and not just for the plans used to create them. In so doing, however, Congress made two important decisions that are relevant to our inquiry. First, buildings would not be subjected to the rigorous conceptual separability analysis applied to PGS works.[191] Instead, architectural works are protectable if they have any "original design elements" that are not "functionally required."[192] Thus, Congress applied a Filtering screen to architectural works that allows authors to obtain a valid copyright on their buildings if they demonstrate copyrightable expression. Now, works that never would have passed the separability test will be protected, at least to the extent that they exhibit appropriate expression.[193] This switch from a Threshold to a Filter substantially expanded the realm of protectable works.

Second, when Congress defined the scope of the works that would be protected as architectural works, it granted protection only to the architectural design of buildings. The House Report clarifies that the term "buildings" refers only to structures typically inhabited by humans, including houses, office buildings, and churches.[194] Works of architectural creativity that do not qualify as buildings—bridges, overpasses, gardens—are excluded from protection altogether.[195] Although a bridge may exemplify substantially greater architectural

[190] 17 U.S.C. §§ 102(a), 120 (2012).

[191] See Clark Proffitt, Note, Poetry or Production: Functionality in the Architectural Works Copyright Protection Act, 39 Ariz. St. L.J. 1263, 1274 (2007) ("The definition of a useful article was not amended by the legislation, but by defining architectural works as a category separate from pictorial, graphic, and sculptural works, the separability test would automatically cease to apply.").

[192] H.R. Rep. No. 101-735, at 20–21 (1990), *as reprinted in* 1990 U.S.C.C.A.N. 6935, 6951–52.

[193] See Richmond Homes Mgmt. v. Raintree, Inc., 862 F. Supp. 1517, 1523 (W.D. Va. 1994), aff'd in part, and rev'd in part, 66 F.3d 316 (4th Cir. 1995). ("If a house design is sufficiently original, copyright protection is not precluded because the design is also utilitarian.").

[194] H.R. Rep. No. 101-735, at 20 (1990), *as reprinted in* 1990 U.S.C.C.A.N. 6935, 6951; see also 37 C.F.R. § 202.11(b)(2) (2011).

[195] See, e.g., Kelley v. Chi. Park Dist., 635 F.3d 290, 292 (7th Cir. 2011); 37 C.F.R. § 202.11(d)(1) (2011).

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expression and creativity than a suburban home or office park, the bridge will not qualify for copyright protection but the home or office park might.

Architectural copyrights bring into stark relief the differences between the three screening regimes that copyright law applies. The change from a Threshold to a Filter for buildings substantially increased the number of works that could receive valid copyright protection. Instead of rejecting almost all aspects of architectural creativity, the AWCPA allows almost all buildings to receive some degree of protection. Nonetheless, functionality screening still must take place, and courts must determine which aspects of an architectural work are expressive and which are functional. And now they must do this for a significantly larger class of works. Determining copyright protection for non-building architectural creativity is, however, much easier—there isn't any. The Exclusion screen means that once a court determines that the claimed work is not a building,[196] it can dispense with further analysis. The work is not protected. As we explain in greater detail in Part IV, the different screening regimes have distinct costs and benefits in terms of error costs and judicial resources. We will return to architectural works below to further illustrate the nature of these arguments for choosing one regime over another.

B. Trademark and Trade Dress Law

Trademark law differs from other forms of IP because it is not designed to encourage the creation of new brands or marks, but instead to protect consumers from confusion by cementing the source-identifying function of marks.[197] Allowing consumers to be comfortable

[196] This is not always an easy task. See Yankee Candle Co. v. New England Candle Co., 14 F. Supp. 2d 154, 159–61 (D. Mass. 1998) (holding that the design of a store within a mall does not constitute a "building" under the Copyright Act).

[197] See, e.g., Landes & Posner, supra note 24, at 167–68; Nicholas Economides, Trademarks, *in* The New Palgrave Dictionary of Economics and the Law 602, 602 (Peter Newman ed., 1998) [hereinafter Economides, Trademarks] (describing the savings for consumers in product searches as one of "[t]he primary reasons for the existence and protection of trademarks"); Stacey L. Dogan & Mark A. Lemley, Trademarks and Consumer Search Costs on the Internet, 41 Hous. L. Rev. 777, 786–87 (2004); Nicholas S. Economides, The Economics of Trademarks, 78 Trademark Rep. 523, 525–27 (1988)

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in identifying brands as associated with specific products in turn allows for a functioning market free of deception.[198]

Consistent with that focus, trademark law protects primarily words, images, and logos that serve as brands. But trademark law has recognized that sometimes the shape, color, or packaging of a product itself can also serve a source-identifying function.[199] The canonical case is the green-gold color of a dry-cleaning pad, which was both distinctive and had come, over time, to be associated with a particular manufacturer of dry-cleaning pads.[200] Protection for source-signifying aspects of product design is known as "product configuration" protection, sometimes used interchangeably with "trade dress" protection.[201]

Figure 12: Qualitex Dry Cleaning Pad

But product configuration is not primarily about identifying source. People generally buy products because of how they work, or perhaps because of how they look, and trademark law is not intended to protect

(discussing the economic benefits of marks that apprise consumers of products' unobservable features).

[198] Cf. Dogan & Lemley, Limiting Doctrines, supra note 64, at 1223–27 (arguing that lowering consumer search costs through trademarks facilitates the functioning of a competitive marketplace); Mark P. McKenna, The Normative Foundations of Trademark Law, 82 Notre Dame L. Rev. 1839, 1841–42 (2007) (arguing that trademark law before the twentieth century was based on unfair competition rather than consumer protection, but noting that they are both serving similar goals in protecting a functioning market).

[199] Two Pesos v. Taco Cabana, 505 U.S. 763, 765 (1992).

[200] Qualitex Co. v. Jacobson Prods. Co., 514 U.S. 159, 166 (1995).

[201] Strictly speaking, trade dress protection can apply either to the product configuration itself or to the packaging of the product. In this Article, we refer to the subset of trade dress protection that covers product configurations.

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either of those things. There is a significant risk that, once the law opens trademark protection to product design, the trademark owner will use that protection to control the way the product works. As the Supreme Court put it, "The functionality doctrine prevents trademark law, which seeks to promote competition by protecting a firm's reputation, from instead inhibiting legitimate competition by allowing a producer to control a useful product feature. It is the province of patent law, not trademark law, to encourage invention . . . ."[202]

Trade dress law also raises a second concern, one not present in copyright: that the trademark owner will use the law to control the way the product looks even though it could not obtain copyright protection or even if that protection would be limited. Thus, trade dress law presents two distinct channeling issues, one between trade dress and patent and a second between trade dress and copyright.[203]

Trade dress law has done two things to mitigate the problem of backdoor patents—that is, the inappropriate use of trademark protection to cover functionality. First, and most directly, trademark law expressly excludes functional products and the functional aspects of design from protection. The statute requires that the trademark owner show that its trade dress is non-functional.[204] A product feature is functional if that feature is "essential to the use or purpose of the article or if it affects the cost or quality of the article."[205] While that sounds like a two-part test, in fact the first part is entirely swallowed by the second. The first part, known as the "competitive necessity" test, is a narrow rule that would allow trademark owners control over a variety of functional elements, so long as there was more than one possible way of making a product.[206]

[202] *Qualitex*, 514 U.S. at 164.

[203] See Mark P. McKenna, An Alternate Approach to Channeling?, 51 Wm. & Mary L. Rev. 873, 875–76 (2009); cf. Robert G. Bone, Trademark Functionality Reexamined, 7 J. Legal Analysis 183, 224–26 (2015) (challenging the channeling explanation for functionality in favor of one based on error costs).

[204] 15 U.S.C. § 1052(e)(5) (2012).

[205] TrafFix Devices v. Mktg. Displays, 532 U.S. 23, 24 (2001) (quoting *Qualitex*, 514 U.S. at 165) (internal quotation marks omitted).

[206] In re Morton-Norwich Prods., 671 F.2d 1332, 1339 (C.C.P.A. 1982). For an argument that would broaden it, see Mark P. McKenna, (Dys)functionality, 48 Hous. L. Rev. 823, 848–60 (2011).

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But as a practical matter, modern utilitarian functionality doctrine is dictated by the limitation that a product feature is not protectable if it "affects the cost or quality of the article."[207]

The Supreme Court's opinion in *TrafFix Devices v. Marketing Displays*[208] is an excellent example of this analysis. The plaintiff was the maker of a road construction sign that included a dual-spring design that had previously been subject to a utility patent. During the period of patent protection, the design had allegedly become a signal to consumers that the sign was produced by the plaintiff. Despite the design's source-signifying ability, the Court ruled that the plaintiff could not use trademark law to protect its design because the springs were designed to make the signs more stable in wind.[209] There were other ways to make road signs, but that didn't matter, because this one arguably worked better. In fact, though, it wasn't critical to the decision that it be *better* than the alternatives. It was sufficient that it worked differently, so that granting trade dress protection would deprive customers of competitive choice between different products of different quality.[210]

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[207] See, e.g., Arlington Specialties v. Urban Aid, 847 F.3d 415, 419 (7th Cir. 2017) (quoting *TrafFix Devices*, 532 U.S. at 32) (internal quotation marks omitted); Groeneveld Transp. Efficiency v. Lubecore Int'l, 730 F.3d 494, 505 (6th Cir. 2013) (finding functionality because "all the elements of Groeneveld's pump are there for some practical benefit or reason. . . . Groeneveld has not presented its pump as in any way the equivalent of an automotive tail fin—a purely ornamental feature that contributes no demonstrable benefit to the operation or efficiency of the designed product" (alteration in original)); Specialized Seating v. Greenwich Indus., 616 F.3d 722, 726–27 (7th Cir. 2010).

[208] 532 U.S. at 23.

[209] Id. at 33–34.

[210] Id.; *Arlington Specialties*, 847 F.3d at 420 (finding that plaintiff cannot protect one of several different designs that present different choices to customers and that "[t]hese different design features present alternative functional designs with different advantages and disadvantages that have nothing to do with the source of a particular product").

As the *Groeneveld* court explained, it does not matter under *TrafFix Devices* that other designs are available to competitors. Focusing on the possibility of doing something a different way "would result in a reversion to the very standard that the Supreme Court unanimously rejected in *TrafFix Devices* . . . . [C]ompetitive necessity is an appropriate avenue of inquiry, the Supreme Court held, only in cases of 'esthetic functionality,' not in cases of utilitarian functionality . . . ." *Groeneveld*, 730 F.3d at 505–06 (quoting *Traffix Devices*, 532 U.S. at 33).

Much of the confusion in the scholarly literature about the test for functionality after *TrafFix Devices* can be traced to a failure to appreciate that cost or quality, not competitive

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Importantly, though, the Court distinguished the spring design from other possible product configuration features that would be "arbitrary, incidental, or ornamental."[211] Such features, including "arbitrary curves in the legs or an ornamental pattern painted on the springs," could serve as protectable trade dress, because they are purely non-functional.[212] According to this reasoning, the utilitarian functionality doctrine in trade dress law is a form of Filtering screen, albeit a specialized one. If a product configuration is functional—whether purely functional or dual-nature—it is screened out and receives no protection. It doesn't matter that that feature is also source-signifying. If it affects the cost or quality of the product, trade dress law won't protect it.[213] That said, the Filtering screen here operates differently than it does in some of the copyright examples we discussed above. Any product element that is functional is excluded from protection. And most cases, like *TrafFix Devices*, that find functionality end up giving no protection to the product shape.[214] But where a particular aspect of a product can be separated from the functional elements, that aspect can be protected despite the functionality of other aspects. Thus, the plaintiff in *Qualitex Co. v. Jacobson Products Co.*[215] can protect the green-gold color of its dry cleaning pad, even though it cannot protect the shape or composition of

necessity or the presence of alternatives, is the proper test for functionality. See, e.g., Justin Hughes, Cognitive and Aesthetic Functionality in Trademark Law, 36 Cardozo L. Rev. 1227, 1234 (2015); Sandra L. Rierson, Toward a More Coherent Doctrine of Trademark Genericism and Functionality: Focusing on Fair Competition, 27 Fordham Intell. Prop. Media & Ent. L.J. 691, 715–17 (2017); cf. Graeme B. Dinwoodie, The Death of Ontology: A Teleological Approach to Trademark Law, 84 Iowa L. Rev. 611, 645–47 (1999) (criticizing the doctrine of aesthetic functionality).

[211] *TrafFix Devices*, 532 U.S. at 34.

[212] Id.

[213] See, e.g., Talking Rain Beverage Co. v. S. Beach Beverage Co., 349 F.3d 601, 603–05 (9th Cir. 2003); Dogan & Lemley, Limiting Doctrines, supra note 64, at 1247 ("Even when consumers have come to associate a particular product feature with a single seller, that feature cannot serve as a trademark if exclusive use of it would put competitors at a non-reputation-related disadvantage."). This creates significant problems of scope when features are both source-identifying and functional. Courts struggle with whether to take seriously the exclusionary nature of the screen, and they don't always get it right. See Lemley & McKenna, supra note 63, at 2257–59; McKenna, supra note 205, at 856–57.

[214] *Traffix Devices*, 532 U.S. at 29.

[215] 514 U.S. 159 (1995).

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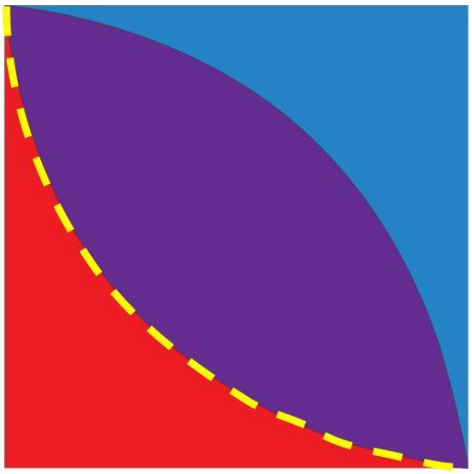
the pad. And the designer of a car can protect certain ornamental features that identify source, like the hood ornament, even though the overall shape of the car is heavily dictated by function.[216] Thus, the trade dress standard is similar in practice to the useful articles analysis copyright law applies to PGS works. Trademark law is supposed to allow protection only for features that can be separated from the functional aspects of the product.[217] Unlike the useful articles analysis, which applies distinctive regimes to useful and non-useful articles, trade dress law applies the same approach to all kinds of product configuration.

Figure 13: Trade Dress Filtering



[216] Even where th therefore bars trade dress protection, co educe any resulting confusion. As Doga

Unlike ger functional products because the c avoiding confusion as to source, that nothing can be done to limit of functionality. As with some ca nded to these risks not by prohib to "use reasonable care to inforn extent that the use may even th ctionality doctrine presupposes ghed by the greater availability o at is at stake, that seems to us tl

Dogan & Lemley, oting Gum, Inc. v. Gumakers of Am., ted); see also Am. Greetings Corp. v. Dan-Dee Imps., 807 F.2d 1136, 1141 (3d Cir. 1986) ("[I]f the functional feature or combination is also found to have acquired secondary meaning, the imitator may be required to take reasonable steps to minimize the risk of source confusion."); cf. Am. Fork & Hoe Co. v. Stampit Corp., 125 F.2d 472, 475 (6th Cir. 1942) ("[I]n order to establish even the limited right of compelling appellant to take positive steps to avoid confusion, the existence of secondary meaning must plainly appear.").

[217] Unfortunately, this doesn't always happen. In *In re Hershey Chocolate & Confectionary Corp.*, No. 77809223, 2–3, 9–10 (T.T.A.B. 2012), for instance, the Trademark Trial and Appeal Board reversed an examiner's determination that Hershey's segmented chocolate bars were functional. The Board acknowledged that scoring was functional and even recognized that there was an expired patent on segmented candy bars. But the Board concluded that *raising* each piece in a step above the score line was non-functional, so the configuration as a whole could be protected.

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There is a second strand to functionality in trademark law, one that corresponds to the problem of channeling between trademark and copyright rather than patent law. Trademark also refuses protection to product design elements that are "aesthetically functional."[218] The term "aesthetically functional" seems an odd one. The idea is that just as utilitarian functionality refuses trade dress protection to product features that have utilitarian value, aesthetic functionality refuses protection to product features that are valued for their attractiveness rather than for their source-identifying function.[219] This screen differs from those in copyright or design patent law, because the point of aesthetic functionality doctrine is to prevent trade dress from overlapping, not with utility patents, but with copyrights and design patents.[220] The Lanham Act "does not protect the content of a creative work of artistic expression" because an "artist's right in an abstract design or other creative work" is protected by copyright law.[221]

The problem, though, is that it is frequently much harder to separate attractiveness and brand identification than it is to separate the utilitarian features from the source-identifying ones. While some companies choose unattractive product features to distinguish their products—think of the green-gold dry cleaning pad—most companies want their products to be both attractive and distinctive. As a result, the test for aesthetic functionality is somewhat less strict than for utilitarian functionality. It prohibits protection only if denying a competitor a design would put that competitor at a "significant non-reputation-related disadvantage."[222] Courts and commentators have struggled to apply this standard.[223] That may be in part because they don't really understand the

[218] *Qualitex Co.*, 514 U.S. at 165–66.

[219] Dinwoodie, supra note 210, at 690–93.

[220] On channeling between copyright and trademark law, see generally Laura A. Heymann, The Copyright/Trademark Divide, 60 SMU L. Rev. 55, 67–74, 76–83 (2007).

[221] EMI Catalogue P'ship v. Hill, Holliday, Connors, Cosmopulos Inc., 228 F.3d 56, 63 (2d Cir. 2000) (citing United States v. Giles, 213 F.3d 1247, 1252 (10th Cir. 2000)).

[222] *TrafFix Devices*, 532 U.S. at 33; Restatement (Third) of Unfair Competition § 17 cmt. c, 175–76 (Am. Law Inst. 1993) ("The ultimate test of aesthetic functionality . . . is whether the recognition of trademark rights would significantly hinder competition.").

[223] See, e.g., McAirlaids, Inc. v. Kimberly-Clark Corp., 756 F.3d 307, 312–13 (4th Cir. 2014) (holding that whether a pixel pattern on fabric was aesthetically functional was a disputed question of fact); Dinwoodie, supra note 210, at 693–94.

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concept of aesthetic functionality. Some courts seem reluctant to exclude attractive design from trade dress protection merely because it is attractive.[224] That is, however, what a strong form of aesthetic functionality would require. And even the weaker "significant disadvantage" test requires that at some point the value of the design is primarily aesthetic rather than source-identifying. At that point, aesthetic functionality should preclude protection. Trade dress should not, for instance, be used to control a style of painting.[225]

Aesthetic functionality, like utilitarian functionality, is (at least in theory) a Filtering screen. Courts should protect aesthetic elements under trade dress law unless doing so puts competitors at a disadvantage by locking up the pleasing designs or colors. But as with copyright's merger doctrine, compared to utilitarian functionality, the aesthetic functionality threshold is pretty generous to the IP owner. The product must be primarily attractive rather than source-identifying before the doctrine will preclude protection altogether.

[224] See, e.g., Bd. of Supervisors of La. State Univ. Agric. & Mech. Coll. v. Smack Apparel Co., 550 F.3d 465, 486–87 (5th Cir. 2008) (refusing to treat the use of school colors on t-shirts as aesthetically functional even though purchasers wanted shirts with school colors to signal affinity with the school, not because they indicated the source of t-shirts).

[225] Dogan & Lemley, Limiting Doctrines, supra note 64, at 1248 ("Many goods are purchased on aesthetics in whole or in part. Allowing someone who develops an attractive style of painting or a sleek design for a product to prevent others from using it interferes with the market for the product and generally serves no trademark-related purpose."). Some courts have permitted this, however. See Romm Art Creations Ltd. v. Simcha Int'l, 786 F. Supp. 1126, 1130, 1135 (E.D.N.Y. 1992).

Justin Hughes argues that aesthetic functionality, properly understood, isn't really about aesthetics at all, but about preventing trademark owners from capitalizing on preexisting cognitive or perceptual biases that make them prefer one product to another. Justin Hughes, Non-Traditional Trademarks and the Dilemma of Aesthetic Functionality, *in* The Protection of Non-Traditional Marks: Critical Perspectives (Irene Calboli & Martin Senftleben eds., forthcoming 2018). We think Hughes identifies an important reason for the aesthetic functionality doctrine, but we are not persuaded it is the only one. Unless a preference for more attractive features is a preexisting cognitive "bias" (and perhaps it is), his approach would permit protection of works based not on their source-identifying qualities but merely because people like them better. Protecting the intrinsic value of a design is something best left to copyright and design patent law.

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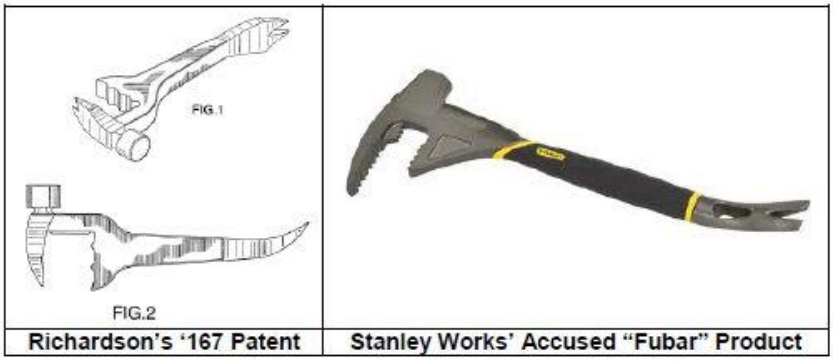
C. Design Patent Law

Design patents are intended to protect the ornamental aspects of functional objects. An object that functions may nonetheless have an aesthetically pleasing form that is not required by and does not contribute to that function. Design patents protect that ornamental form rather than the functional object. While design patents, unlike copyrights, are examined by the PTO, that examination process is much more pro forma than it is for utility patents. Perhaps in part because of the difficulty of searching designs, the PTO is extremely unlikely to reject a design patent application as too similar to existing designs.[226] Despite their name, design patents have more in common with copyright law than with utility patent law. And because they are easier to get than utility patents, there is a risk that design patents owners will use their patents to try to prevent competitors from using the functional aspects of the product.[227] In *Richardson v. Stanley Works*,[228] for instance, the design patent covered the design of a multifunction tool called the "fubar." The defendant made a multifunction tool that included the same tools in the same locations, but featuring some differences in shape and a different orientation of the tools. The patentee sued, arguing, in effect, that the defendant's product was too similar to the patent because it included the same tools in the same basic shape and the same locations.[229]

Figure 14: Richardson v. Stanley Works



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Sarah Burstein, Rx Decals, Design Law Blog (Oct. 10, 2015), http://design-law.tumblr.com/post/63042465731/seriously-issued-this-weekd690766-for-a [https://perma.cc/4FMZ-8GPY].

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Design patent law, like copyright, needs a functionality restriction to prevent claimants from taking advantage of its easier review standards. Consistent with this logic, the *Richardson* court concluded that a design patent on the ornamental aspects of the fubar could not be allowed to prevent competitors from designing a multifunction tool that performed the same functions in the same way.[230] But *Richardson* is unusual in narrowing protection under this test. In most cases, that test will lead a court to refuse to find functionality as a reason to narrow or eliminate the scope of the design patent.[231]

Design patent law's functionality exception is significantly narrower than the corresponding functionality doctrines in either copyright or trade dress law. This is largely because design patent law treats a much larger swath of creations as non-functional. Trade dress law excludes product configuration from protection if the shape of the product affects its cost or quality, and copyright law refuses protection to elements dictated by function or in which there are only a limited number of options available. Design patent functionality, by contrast, refuses protection to a design element only if there is no other alternative to the element.[232] That is a narrow definition of functionality that affects the

[230] *Richardson*, 597 F.3d at 1293–94.

[231] Sarah Burstein, *Faux Amis* in Design Law, 105 Trademark Rep. 1455, 1456–57 (2016).

[232] See, e.g., Ethicon Endo-Surgery v. Covidien, Inc., 796 F.3d 1312, 1329–30 (Fed. Cir. 2015); Jason J. Du Mont & Mark D. Janis, Functionality in Design Protection Systems, 19 J. Intell. Prop. L. 261, 281–85 (2012). A rare example in which a court found no alternative is *Best Lock Corp. v. Ilco Unican Corp.*, 94 F.3d 1563, 1566 (Fed. Cir. 1996) (holding that the design of a key blade blank was dictated solely by its function of allowing keys to be cut into it).

Some courts have articulated a multifactor test for design patent functionality:

> Assessing various factors may help determine whether a claimed design, as a whole, is "dictated by" functional considerations:
>
> > [1] whether the protected design represents the best design; [2] whether alternative designs would adversely affect the utility of the specified article; [3] whether there are any concomitant utility patents; [4] whether the advertising touts particular features of the design as having specific utility; [5] and whether there are any elements in the design or an overall appearance clearly not dictated by function.

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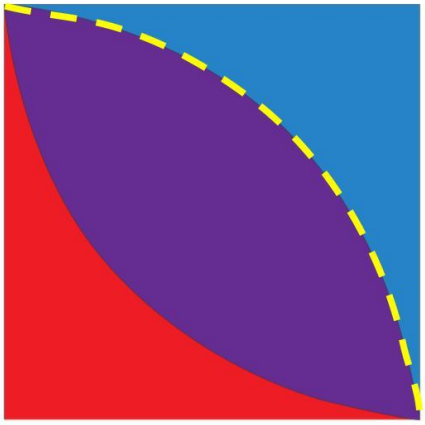
nature of the functionality screen. It means that design patents can and do end up protecting design elements that perform a valuable function, simply because there are other possible ways of implementing the function, even if they aren't as good. To count as "functional" for purposes of a design patent then, it is not sufficient that a component has utility, as it is for copyright and trademark law. The component must be the *only* way of achieving that utility to be excluded. In effect, this means that dual-nature features of designs are not excluded as they are in copyright and trade dress law but rather included into the claim of the patent.

Figure 15: Design Patent Functionality Screening



This difference was strikingly illustrated in *Apple Inc. v. Samsung Electronics Co*.[233] The jury in that case had found that Samsung's smartphones infringed both Apple's trade dress and its design patents. Those legal rights covered the very same design elements of Apple's iPhones. Nonetheless, on appeal, the Federal Circuit treated the trade

High Point Design v. Buyers Direct, 730 F.3d 1301, 1315 (Fed. Cir. 2013) (quoting PGH Techs. v. St. John Cos., 469 F.3d 1361, 1366 (Fed. Cir. 2006)). But even that court has emphasized that the fact that a design is primarily functional is not enough reason to reject a design patent for functionality.

[233] 786 F.3d 983 (Fed. Cir. 2015), rev'd on other grounds, 137 S. Ct. 429 (2016).

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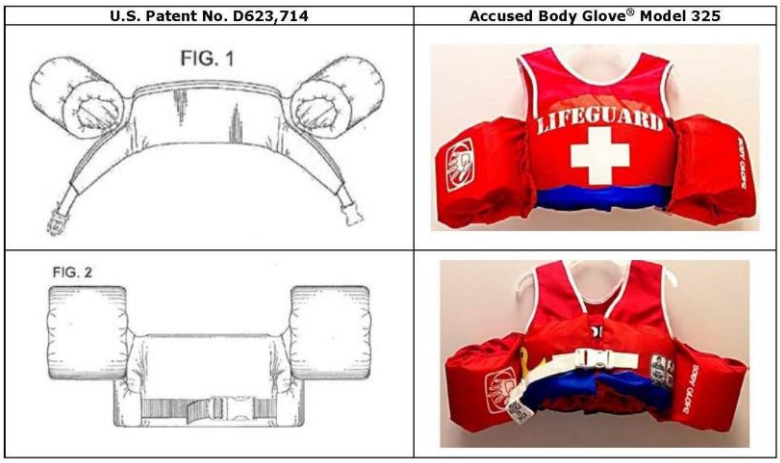
dress and design patent functionality issues differently. The court held that the design of the iPhone *was* functional under trade dress law because it affected the perceived quality of the product, but that the same design *was not* functional under design patent law because there were other ways to design a phone.[234] *Apple v. Samsung* demonstrates the narrow nature of design patent functionality law and how it differs from the doctrine of the same name in trade dress law.[235]

In fact, however, recent cases suggest design patent functionality is narrower still. In *Sport Dimension v. Coleman Co.*, the plaintiff alleged infringement of its design patent for a personal flotation device.[236] The district court construed the claim as covering: "The ornamental design for a personal flotation device, as shown and described in Figures 1–8, except the left and right armband, and the side torso tapering, which are functional and not ornamental."[237] The armbands are necessary to the purpose of the flotation device; they are the things that make the vest float. The district court concluded, and the Federal Circuit did not dispute, that the armbands were functional even under the narrow design patent definition of functionality.[238]

Figure 16: Sport Dimension v. Coleman Co.



[234] (Fed. Cir. 2 mark law).

[235] User Interf n has accor it is non-f ment, Optin ntiary Burd Rev. 2249, 2250, 2278–91 (2015).

[236] 820 F.3d 1316, 1318–19 (Fed. Cir. 2016).

[237] Id. at 1319.

[238] Id. at 1322.

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Nonetheless, the Federal Circuit held that the district court's claim construction improperly eliminated the functional aspects from the claimed design.[239] The Federal Circuit said that despite its functional aspects, the ornamental design must be protected as a whole. As the court put it, a court cannot "eliminate a structural element from the claimed ornamental design, even though that element also serve[s] a functional purpose."[240] The district court erred, on this view, when it construed the claim so as to completely eliminate the functional features from the scope of the claim; rather, it should have looked to the "overall design of Coleman's personal flotation device."[241] Notably, that means that the court should have allowed protection for features even though they are functional.

The Federal Circuit's decision in this regard creates a conflict with its prior opinion in *Richardson*.[242] Instead of functionality causing the law to refuse protection to elements that included both functional and ornamental parts, *Sport Dimension* does the opposite. It says, in effect, that if a design has both functional and ornamental parts, design patent law *will* protect the functional parts in order to make sure that it also protects the ornamental parts.[243] The approach taken here is the inverse of how copyright law treated aspects of a design that are both functional and non-functional before *Star Athletica*. When a particular feature, for example, the leg of chair, is both functional and non-functional, copyright law excluded the design of the leg.[244] The rule applied in *Sport Dimension*, however, would include the design of the leg within the scope of patent.[245]

[239] Id. at 1321–23.

[240] Id. at 1321.

[241] Id. at 1323.

[242] 597 F.3d at 1288.

[243] *Sport Dimension*, 820 F.3d at 1323.

[244] Or at least it did before *Star Athletica*. The result after that case is unclear. See supra Subsection III.A.2.b.

[245] In theory, design patent law might moderate the effects of this approach by narrowing the scope of the design patent at the infringement stage. But there is little evidence it actually does so in practice.

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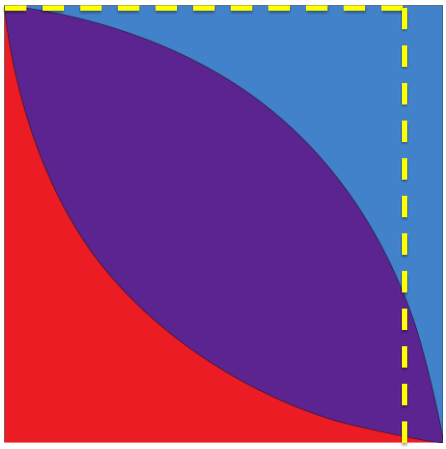
If we depict the *Sport Dimension* approach using our graphics, it would look like this.

Figure 17: Design Patent Screening in Sport Dimension v. Coleman Co.



Because it is in conflict with *Richardson*,[246] it remains to be seen whether this approach will prevail. But if it does, it will effectively eliminate the functionality doctrine in the vast majority of design patent cases. Only a design that was close to 100% functional would not receive protection. This looks like the opposite of Exclusion. Perhaps we could call it Inclusion.

IV. ASSESSING FUNCTIONALITY SCREENS

Every IP field doctrine has a different approach to functionality. And in some fields, different parts of the law take different approaches to functionality, either because the statute requires it (as in copyright) or

[246] See supra notes 225–28 and accompanying text (discussing *Richardson*). It is also inconsistent with the approach to design patent functionality in the European Union. See generally Jason J. Du Mont & Mark D. Janis, Functionality in U.S. Design Patent and Community Design Law, *in* Research Handbook on Design Law (forthcoming 2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2773070 [https://perma.cc/G26A-LNJB] (discussing the respective functionality approaches of the United States and the European Union).

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because court decisions are in conflict. Yet despite the voluminous literature on functionality and IP law, there has been little systematic investigation of the costs and benefits of different techniques for screening functionality. In this Part, we offer such an analysis, focusing on the ways that the different screens generate administrative costs and error costs. Then, we consider whether the particular standards used in each field are appropriate in light of the costs and benefits they produce.

A. The Costs and Benefits of Screening Functionality

Each of the approaches to screening functionality has benefits and costs. In particular, the different screening mechanisms generate different administrative costs, including litigation costs, and different error costs.[247] We review them here.

1. Administrative and Litigation Costs

Like all legal doctrines, the functionality screens impose certain costs, although some screens are costlier than others. All legal rules entail some degree of administrative costs.[248] For IP rights, these include the expenses associated with examining and registering claims at the Copyright Office and, especially, at the PTO.[249] Copyright, trademark,

[247] Richard A. Posner, An Economic Approach to Legal Procedure and Judicial Administration, 2 J. Legal Stud. 399, 399–400 (1973) ("The purpose of legal procedure is conceived to be the minimization of the sum of two types of costs: 'error costs' (the social costs generated when a judicial system fails to carry out the allocative or other social functions assigned to it), and the 'direct costs' (such as lawyers', judges', and litigants' time) of operating the legal dispute-resolution machinery."). Posner's "direct costs" are now generally referred to as "administrative costs."

[248] William McGeveran, The Trademark Fair Use Reform Act, 90 B.U. L. Rev. 2267, 2280 (2010) ("Administrative costs are the costs of making a decision. Examples of administrative costs in expressive use cases might include the cost of empanelling a jury, or the cost of commissioning a survey to determine whether a mark has secondary meaning." (footnote omitted) (citing Eugene Kontorovich, The Constitution in Two Dimensions: A Transaction Cost Analysis of Constitutional Remedies, 91 Va. L. Rev. 1135, 1147 (2005); Howard A. Shelanski & J. Gregory Sidak, Antitrust Divestiture in Network Industries, 68 U. Chi. L. Rev. 1, 19 (2001))).

[249] Jason Schultz & Jennifer M. Urban, Protecting Open Innovation: The Defensive Patent License as a New Approach to Patent Threats, Transaction Costs, and Tactical Disarmament, 26 Harv. J.L. & Tech. 1, 9 (2012).

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and design patent laws all impose at least some degree of administrative review in order to register works, marks, and designs. For example, the Copyright Office will review registrations for PGS works to determine whether they satisfy the useful articles doctrinal threshold.[250] If a putative author attempts to register the design of an automobile for copyright protection, the Copyright Office will reject the registration.[251] Similarly, for trademarks and design patents, the PTO will apply those regimes' functionality screens as a matter of ex ante review before registration.[252] The review in the PTO is significantly more detailed—and therefore costlier—than in the Copyright Office, however.[253]

In addition, granting rights over works, designs, and marks means that some claimants will generate litigation expenses both for the legal system and for the parties.[254] In some cases, litigation can entail judicial review of administrative decisions by the Copyright Office and the PTO.[255] In other cases, it will involve suits for violation of rights or for declaratory judgment that rights have not been infringed. All litigation consumes scarce judicial and attorney resources and is, at best, zero sum for the field as a whole.[256] The magnitude of litigation costs is likely to vary, however, depending on when and how functionality screens apply. The earlier a court applies a functionality screen, the less likely it is the case will settle before it and the parties have to expend the resources to

[250] U.S. Copyright Office, supra note 179, at ch. 900, § 924.2.

[251] See id. § 924.1.

[252] See 15 U.S.C. § 1052(e)(5) (2012) (denying registration to any matter that is functional); Craig Zieminski, Note, A Function for Markman Claim Construction in Design Patents, 90 J. Pat. & Trademark Off. Soc'y 326, 329–30 (2008) (discussing design patent applications); see also Barton Beebe, Is the Trademark Office a Rubber Stamp?, 48 Hous. L. Rev. 751, 758 (2011) (discussing trademark registration process).

[253] Little is known about how rigorously the Copyright Office reviews applications as an empirical matter, but it is widely agreed to be an easier hurdle for applications than the PTO is. See Schultz & Urban, supra note 249, at 9.

[254] See James Bessen & Michael J. Meurer, Essay, The Direct Costs from NPE Disputes, 99 Cornell L. Rev. 387, 422–23 (2014).

[255] Thomas G. Field, Jr., Judicial Review of Copyright Examination, 44 IDEA 479, 481 (2004); Jonathan S. Masur & Lisa Larrimore Ouellette, Deference Mistakes, 82 U. Chi. L. Rev. 643, 653 (2015).

[256] That is, the winning party never wins more in value than the losing party loses when accounting for each side's litigation costs and the costs of running a judicial tribunal.

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litigate functionality. On the other hand, to the extent that functionality screens occur earlier in litigation, as matters of law or in scope determinations, the costs of trying cases and empaneling juries will be eliminated when the claims are dismissed as a result of the review.

Assessing the value of administrative and litigation costs associated with a particular legal rule can be difficult. Often there will be a tradeoff between upfront costs of examining and registering works, marks, and designs and downstream litigation costs.[257] On the one hand, increasing the degree of ex ante examination provided at an early stage will increase costs for administrative agencies,[258] but, on the other hand, by refusing to grant certain dubious IP rights in the first instance, courts and litigants will be spared the costs of trials.[259] To know which cost is greater, we need to know not only how much time and money parties and decisionmakers spend at each stage, but also how likely it is that a party granted an IP right will enforce that right in court.[260] Thus, the value of different screening mechanisms will be based on the magnitude of administrative costs and their effect on the magnitude of litigation costs.[261] Their value will also be based on the strength of the presumptions afforded to ex ante determinations. When those determinations are challenged in court, the benefits of initial screening disappear.

[257] See David Fagundes & Jonathan S. Masur, Costly Intellectual Property, 65 Vand. L. Rev. 677, 681–85 (2012) (discussing the social value of costly screens); Jonathan S. Masur, Costly Screens and Patent Examination, 2 J. Legal Analysis 687, 710 (2010).

[258] See Thomas F. Cotter, The Procompetitive Interest in Intellectual Property Law, 48 Wm. & Mary L. Rev. 483, 489–90 (2006) (noting that the costs of deep inquiry into competitive effects may not be worth the benefits to competition).

[259] See Masur, supra note 257, at 709–11.

[260] Id. at 687 (noting that examiners spend eighteen hours on average on every utility patent). We suspect that the number is lower for design patents.

[261] See Fagundes & Masur, supra note 257, at 691–94.

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2. Error Costs

In an ideal world, no one makes mistakes. But we don't live in such a world.[262] Determining whether a given feature of a product is functional or not is a difficult task, and decisionmakers are bound to make mistakes. Accurately assessing functionality requires coherent and articulable standards for understanding which design elements to sort into which categories.[263] For example, should a design feature be treated as functional if the designer intended it to be functional, or should it be treated as functional if consumers treat it as functional?[264] Any single, coherent article or product has to be dissected and its components analyzed. This might not be difficult in some cases, but in other cases it is impossible because the two literally cannot be separated. In addition, claimants will have strategic reasons for arguing that functional elements are, instead, expressive ones. All of these challenges, and the limited capacities of the human mind, are bound to produce errors.

When decisionmakers err, they can produce false negatives (failing to identify functional elements) or false positives (mistakenly treating an expressive element as functional).[265] In the former, designs get protected that should not be, and in the latter designs that should be protected are not. In determining the value of different screening regimes, the law should consider both the relative costs of each of these kinds of errors and their relative probabilities.

False positives and false negatives for functionality impose different sorts of costs on an IP system.[266] When a decisionmaker determines that a feature or design is functional when it isn't, the creator of that feature

[262] See generally Joseph Scott Miller, Error Costs & IP Law, 2014 U. Ill. L. Rev. 175 (discussing the types of errors courts make when determining the scope of IP rights and the costs of those errors).

[263] McKenna & Sprigman, supra note 7, at 493–94.

[264] Brandir Int'l v. Cascade Pac. Lumber Co., 834 F.2d 1142, 1146–47 (2d Cir. 1987); Jeanne C. Fromer & Mark A. Lemley, The Audience in Intellectual Property Infringement, 112 Mich. L. Rev. 1251, 1301–04 (2014) (discussing how the perspective of the decisionmaker matters in assessing IP rights). The Supreme Court rejected an artist's intent test in *Star Athletica v. Varsity Brands*, 137 S. Ct. 1002, 1014–16 (2017).

[265] Miller, supra note 262, at 182.

[266] Id. at 182–85 (discussing the differences between false positive costs and false negative costs).

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will be denied an IP right when one was appropriate. Because IP rights generally[267] exist to encourage certain kinds of behavior, the loss of a right due to a false positive creates an *incentive cost*. If a court treats the design of a lamp base as functional when it should have been treated as non-functional, designers of lamp bases will be insufficiently incentivized to create them. Conversely, when a decisionmaker determines that a feature or design is not functional when it actually is, the creator of the feature will be given an IP right when one was not warranted or a right that controls more than it should. Because IP rights limit the abilities of others to reproduce and use works, marks, and designs, false negatives for functionality create *competition costs*. The owners of inappropriately granted rights will be able to limit competition for functional items without having passed the more stringent tests for utility patents.

As we explain more below, the different functionality screens vary in the extent to which they are likely to produce false positives and false negatives for functionality. When considering the value of different functionality screens, then, the law must weigh the relative magnitudes of false positives and false negatives. It is possible that false positives for functionality are just as costly as false negatives. We strongly doubt that this is the case. False negatives for functionality are, as we explained above, enormously costly to society, because they allow creators to control competition (and thus the price of access to works) without satisfying the demands of utility patent law.[268] Inappropriately protecting functional components of designs through copyright, trademark, or design patents can have considerable influence on the prices that consumers pay for products and on the opportunities that downstream creators have for reusing them. By contrast, failing to protect a design that should have received protection is not likely to be all that harmful. In copyright and design patent law, the immediate incentive effects are likely to be negligible, since the works have already

[267] As we explained above, trademark law is less about encouraging creative behavior than it is about protecting consumers from confusion in the marketplace. See supra notes 197–97.

[268] See Miller, supra note 262, at 182 ("[F]alse positives (erroneous grants of an IP entitlement) are systematically more costly than false negatives (erroneous denials of an IP entitlement).").

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come into existence. The public has already gotten the benefit of the creations. Subsequent creators may be less motivated to create new works if they fear under-protection, but this is not obviously the case, especially if the decision that the design is functional is fact-specific rather than broad.[269] And, in trademark law, if trade dress is improperly denied protection due to perceived functionality, the claimant can adopt another mark that can serve the same purpose. For example, instead of relying on the design of the product to signal source, the producer can instead include a word mark that has the same effect. Indeed, it is rare in the extreme that a product configuration itself is the only or even the primary way in which a producer brands its product.[270]

Finally, in considering the costs and benefits of the different functionality screens, the law must evaluate the probability that decisionmakers will make one or the other kind of error.[271] If decisionmakers' errors are randomly distributed, they may not have a particularly strong effect on the efficiency of the IP system as a whole.[272] But it is possible instead that decisionmakers' errors are systematically skewed. We suspect, for example, that decisionmakers are risk averse about denying protection, because the costs of denial are more salient (someone loses a right) than are the costs of protection (diminished competition). In addition, litigants' strategic behavior, especially in ex parte proceedings before the Copyright Office or the PTO, as well as decisionmakers' financial incentives to grant rights,[273] will produce more

[269] For example, if creators are generally over-optimistic about the value of what they have created, they may not be concerned about future works not obtaining protection. Christopher Buccafusco & Christopher Jon Sprigman, The Creativity Effect, 78 U. Chi. L. Rev. 31, 31 (2011); Andres Sawicki, Risky IP, 48 Loy. U. Chi. L.J. 81, 83–87 (2016).

[270] See, e.g., Deven R. Desai, From Trademarks to Brands, 64 Fla. L. Rev. 981, 993 (2012); Philipp G. Sandner, The Identification of Trademark Filing Strategies: Creating, Hedging, Modernizing, and Extending Brands, 99 Trademark Rep. 1257, 1262 (2009) (discussing the common practice of multiple branding of products).

[271] Posner, supra note 247, at 401.

[272] Although some designs will be protected when they should not have been, others will not be protected when they should have been. Random errors will wash out. This will still be costly, however, because it produces greater uncertainty for claimants and for litigants.

[273] See Michael D. Frakes & Melissa F. Wasserman, Does Agency Funding Affect Decisionmaking?: An Empirical Assessment of the PTO's Granting Patterns, 66 Vand. L. Rev. 67, 70 (2013) (presenting data suggesting that the PTO's fee schedule biases it towards granting patents).

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false negatives than false positives for functionality, and the law will tend to over-protect designs. It may also be the case that judges and juries assess functionality differently. There is some evidence that juries are more likely than judges to make holistic judgments about similarity rather than parsing the work and filtering out unprotected elements.[274]

In light of this analysis of administrative and error costs, we now address the relative merits of the different functionality screens.

B. Analyzing the Costs and Benefits of the Different Screens

Filtering. Filtering is potentially the most accurate system for dividing non-functional from functional elements. If courts can accurately determine functionality, they can precisely parse the wheat that is potentially worthy of protection from the chaff that isn't. As a result, the law doesn't have to worry about under-protection in the ways that arise with other regimes. At least in an ideal world, there will be no false positives for functionality—situations in which otherwise protectable content is excluded. In addition, in an ideal world, there will be no false negatives for functionality, where functional content inappropriately receives protection. If decisionmakers apply Filtering correctly, almost every work, mark, or design will receive some protection, and their non-functional elements will be protected while their functional elements will not.

"If decisionmakers can get it right" is an awfully big "if," however. Parsing non-functional from functional content is difficult. As we noted above, we suspect that decisionmakers are likely to produce more false negatives for functionality than false positives.[275] This may occur because agencies, courts, and juries are more reluctant to deny protection than to grant it. The costs of denial are likely to appear more salient than the costs of granting protection.[276] Given the greater prevalence of false negatives for functionality and claimants' strategic behavior, Filtering may often result in significant competition costs.[277]

[274] See Fromer & Lemley, supra note 264, at 1283.

[275] See Frakes & Wasserman, supra note 273 and accompanying text.

[276] Id. at 70.

[277] See supra notes 267–68 and accompanying text.

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Conversely, because almost every work will receive at least some protection under a Filtering approach, almost no works, marks, or designs will be removed from the system ex ante. This will reduce the risks of incentive costs due to under-protection. In theory, we could mitigate that risk by finding only narrow protection for those works when it comes to infringement, but as Mark Lemley and Mark McKenna have argued, courts are unlikely to do so when the invalidity and non-infringement inquiries are separated, as they frequently are.[278]

Filtering, because it typically happens during infringement litigation, tends to be associated with ex post jury review rather than ex ante administrative or judicial review.[279] Accordingly, because Filtering tends not to kick creations out of the legal system at the outset, it produces fewer upfront administrative costs but much greater downstream litigation costs. Further, because Filtering is so fact-specific, it is very hard to do at the outset of a case, even if the case seems like one that should be easy.[280] And the result will be correspondingly less certain. More cases will go to trial under a Filtering approach, increasing costs for both courts and parties. Those costs in turn might drive cost-sensitive defendants to cave in rather than fight a case to the finish. Whether these risks are worth it depends, in part, on how many claimants are deterred by a regime that applies some Exclusion or Threshold criteria early on, creating the possibility of incentive costs.[281]

Thus, Filtering will have the most value in situations where incentive costs from under-protection are highest and competition costs from over-protection are lowest. In particular, Filtering will have the greatest value when there are works with high functionality but that nonetheless need copyright, trademark, or design patent protection for their non-functional components. Finally, Filtering will work best when litigation costs are low relative to administrative costs, because almost all works will enter the legal system.

[278] Lemley & McKenna, supra note 63, at 2267–68.

[279] Id. at 2268; Fromer & Lemley, supra note 264, at 1269; Risch, supra note 232, at 55.

[280] Cf. Cotter, supra note 258, at 490 ("[T]he social benefits of protecting the IP rights at issue [may] not [be] sufficiently large as to warrant investment of substantial resources into more accurately evaluating competitive need.").

[281] See Fagundes & Masur, supra note 257, at 682.

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Exclusion. Exclusion regimes, which offer no rights to any works, marks, or designs, offer the converse benefits and costs to Filtering regimes. Administrative costs for maintaining an Exclusion regime arise almost exclusively at the outset, when Congress or the courts must decide in the first instance what types of works should be excluded from protection altogether. But once they have, all a decisionmaker needs to do is determine that a work fits within that category and the case is over. There will be little need for administrative review and almost no litigation, since there are no rights to dispute.[282]

All of these cost-savings produce one significant issue, though. The Exclusion screen denies protection to legitimate non-functional elements. Because they are rules rather than standards, Exclusion regimes offer no opportunity for balancing, and will eliminate a good deal of expressive material precisely because they are not sensitive to context.[283] For example, prior to the enactment of the AWCPA,[284] the non-functional components of built architecture received absolutely no protection against copying in other buildings.[285] Exclusion regimes will generate no competition costs, because all works are automatically excluded, but potentially considerable incentive costs, because creative efforts in these fields will receive no formal legal protection.

Accordingly, Exclusion regimes are bound to be most valuable when administrative and litigation costs are high. More importantly, though, Exclusion will make the most sense in situations where incentive costs

[282] Parties may, of course, dispute whether their works were accurately categorized. See, e.g., Bikram's Yoga Coll. of India v. Evolation Yoga, 803 F.3d 1032, 1043 (9th Cir. 2015) (holding that plaintiff's attempt to characterize a yoga routine as a choreographic work failed).

[283] To the extent the design patent system matches any of the functionality screens, the best way to think of it is as a reverse Exclusion system, requiring protection even for functional elements in order to ensure protection for expressive elements. The costs and benefits of such a system mirror those for true Exclusion screens: it is easy to administer, but carries a substantial risk of over- rather than under-protection in cases where a design has significant functional elements.

[284] Architectural Works Copyright Protection Act of 1990, Pub. L. No. 101-650, §§ 701–06, 104 Stat. 5089, 5133 (1990) (codified at 17 U.S.C. § 101 note (2012)).

[285] See Shipley, supra note 187, at 3–4.

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are low (perhaps because other means of protection are available) and competition costs are high.[286]

Thresholds. A Threshold screen shares aspects of both a Filtering screen and an Exclusion screen. As one might expect, therefore, Thresholds share some of the benefits and costs of each system. If the Threshold is applied when a creator first applies for rights or at the outset of litigation, it can quickly reject dubious claims to protectable expression when the work as a whole is overwhelmingly functional.[287] That reduces costs for courts and litigants, and it allows courts to screen out the weakest cases. The added expense of functionality Filtering during litigation need only occur for a limited class of works, marks, or designs.

A Threshold regime also attempts to balance risks of over-protection and under-protection that arise from Filtering and Exclusion regimes, respectively. Because works, marks, and designs with little non-functional content will fall below the threshold and receive no protection, there is little concern that decisionmaker errors will result in over-protection and competition costs for highly functional products. At the same time, a Threshold system carries less risk of under-protecting non-functional content than an Exclusion system, because as the amount of expression increases beyond the threshold, it can switch to a Filtering regime, allowing protection for works with significant non-functional content.

That Goldilocks-style compromise comes at a cost, however. As we explained above, establishing and applying the Threshold can be difficult.[288] A Threshold system combines the difficulty of case-by-case Filtering with the added burden of deciding what to exclude entirely from protection. While in many respects Thresholds offer more certainty than Filtering screens, they also create additional uncertainty as to where the line between Filtering and Exclusion gets drawn. And an error there matters a lot, because it can make the difference between protection and no protection. If decisionmakers err in setting that line, the outcomes are

[286] For an argument that Exclusion should apply to user interfaces in software, see Samuelson et al., supra note 104, at 2365–66.

[287] This will occur when the screen applies during application or registration procedures.

[288] See supra note 77.

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stark. If decisionmakers err and apply a higher-than-appropriate threshold, a substantial amount of expression gets no protection (an incentive cost). On the other hand, if decisionmakers place the threshold too low, designs will receive some protection that never should have received any (a competition cost).

Threshold regimes will operate most efficiently in situations where investing ex ante administrative costs will correctly exclude many works that are highly functional. If an agency or court can determine quickly that some works, marks, or designs should get no protection, the costs of litigating and enforcing those rights is minimized. In addition, Threshold regimes will likely work best in situations where there are significant differences in the relationship between incentive costs and competition costs across different sorts of products. The threshold should be applied such that the designs falling above the threshold and receiving protection are the ones where under-protection would be costlier than over-protection. Conversely, then, the designs falling below the Threshold and being excluded from protection are those where over-protection would be costlier than under-protection.

C. Do the Current Functionality Screens Make Sense?

An understanding of the costs and benefits of various functionality screens allows us to think about how the law might select the best functionality screen in light of different sorts of creativity and markets. As we have argued, the relative value of the different screens depends on the tradeoffs of costs and benefits associated with administration and litigation and with over- and under-protection.[289] Actually measuring these costs is a daunting empirical enterprise far beyond the scope of any one paper. Thus, rather than stipulating what the costs and benefits actually are, we instead approach the different IP regimes by describing what facts about costs and benefits would have to be in order to justify the current system. And while we will offer our own views about each case, we leave it to individual readers to determine whether they believe that the necessary conditions hold.

[289] See supra Section IV.A.

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1. Copyright Law

It shouldn't be surprising that copyright law doesn't use the same functionality screen for all classes of works. The relative merits of the different functionality screens depend on the tradeoffs between incentive and competition costs, and there is little reason to believe that those tradeoffs are the same for the wide panoply of works that copyright law covers.[290] Paintings, books, computer programs, dance routines, and works of three-dimensional design are subject to radically different markets, and the influences of functionality differ across these media.[291]

As we illustrated in Section III.A, literary works, including computer programs, are subject to Filtering. In practice, this means that almost all literary works will receive some form of copyright protection, unless they fall at the very end of the functionality spectrum where the merger doctrine takes hold. The Copyright Office readily registers literary works without substantial inquiry into the existence of meaningful expression within the work. This is true even for computer software, even though the vast majority of the code in a work exists for functional rather than expressive purposes.[292]

According to our analysis, Filtering makes the most sense when ex post litigation costs are low relative to ex ante administration costs and when incentive costs are high relative to competition costs. Are these observations true of copyright protection for literary works? We are doubtful that the first condition obtains. Litigation costs are likely to be particularly high in the case of highly functional literary works, because jurors will often struggle to separate expression from function in works like codes, taxonomies, and, especially, computer software.[293] These

[290] See Michael W. Carroll, One for All: The Problem of Uniformity Cost in Intellectual Property Law, 55 Am. U. L. Rev. 845, 846–47 (2006) (describing variance in creative practices and costs of uniform IP law); see also Dan L. Burk & Mark A. Lemley, Policy Levers in Patent Law, 89 Va. L. Rev. 1575, 1577–79 (2003) (comparing innovation costs in different industries and arguing that "it makes sense to take economic policy and industry-specific variation into account explicitly in applying general patent rules to specific cases").

[291] See Dotan Oliar & Christopher Sprigman, There's No Free Laugh (Anymore): The Emergence of Intellectual Property Norms and the Transformation of Stand-Up Comedy, 94 Va. L. Rev. 1787, 1840 (2008) (noting the differences in creativity markets across the wide range of media protected by copyright law).

[292] Samuelson et al., supra note 104, at 2317.

[293] See id. at 2315–19.

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challenges, and the general features of Filtering regimes, will tend toward over-protection of highly functional literary works relative to the ideal case. Whether some degree of over-protection is justified depends, of course, on the opposite case—whether diminished incentives from under-protection are worse. At least in the context of computer software, there were some people who believed this to be true in the 1970s when copyright for programs was being debated.[294] Because the functional aspects of programs would rarely meet patent law's more stringent demands, computer software would go entirely unprotected from piracy unless copyright law stepped in. Whether these concerns about incentives were justified at the time we leave to others to debate.[295] But things have changed. Software is patentable, and there doesn't seem much risk that companies will not be sufficiently motivated to develop it. Further, protecting software with copyright law has led some courts to protect not just computer programs against outright piracy but also to protect basic program design[296] and functional code elements against socially valuable purposes like interoperability.[297] These mistakes generate substantial competition costs.

Other literary works—the vast majority—have more expressive content, of course, and it makes sense to protect them with a Filtering regime. Copyright law generally deems it appropriate to grant protection to books about functional topics, for example, knowing that the copyright will extend only to the way the author wrote about the topic and not the function itself.[298] Precisely because of their high expressive content, however, both Threshold and Filtering will produce the same result for those works. As we noted above, though, copyright law does

[294] For discussion of these issues, see Pamela Samuelson, CONTU Revisited: The Case Against Copyright Protection for Computer Programs in Machine-Readable Form, 1984 Duke L.J. 663, 665–66; Nat'l Comm'n on New Tech. Uses of Copyrighted Works, Final Report 3–8 (1979).

[295] See, e.g., Samuelson et al., supra note 104, at 2310–13.

[296] Whelan Assocs. v. Jaslow Dental Lab., 797 F.2d 1222, 1224–25 (3d Cir. 1986).

[297] Oracle Am. v. Google Inc., 750 F.3d 1339, 1358–59 (Fed. Cir. 2014).

[298] See Baker v. Selden, 101 U.S. 99, 103 (1879) ("The copyright of a work on mathematical science cannot give to the author an exclusive right to the methods of operation which he propounds, or to the diagrams which he employs to explain them, so as to prevent an engineer from using them whenever occasion requires.").

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apply a functionality threshold when it invokes the merger doctrine.[299] Once the range of expressive choices available to subsequent authors drops so low that it imposes substantial restraints, copyright protection is no longer available. In effect, copyright law's use of a merger threshold is an acknowledgement that at a certain level of functionality, competition costs are too high.

One way of dealing with copyright's lumping together of highly expressive and highly functional works in the same category of literary works would be to strengthen the bite of the merger threshold by moving it to the left in Figure 7. Because software can receive utility patent protection, copyright law is less essential to providing creative incentives, but the competition costs of overprotection remain. Denying copyright to more works that are almost entirely functional might prove beneficial. In addition, use of a Filtering system does not mean that the filtering decision must be done by the jury. A more structured effort to distinguish protectable from unprotectable content pre-trial may lead both to more accurate determinations of what is protected and to lower administrative costs.[300]

How about architecture? Recall that architectural works, following the AWCPA, are now also subject to functionality Filtering in copyright law.[301] Exclusion from copyright protection was no longer an option for architectural works given the United States' desire to join the Berne Convention,[302] but was Filtering the correct choice? We are doubtful. First, most of the litigation involving architectural works has involved buildings toward the high end of the functionality spectrum, including suburban homes, retirement villas, and the like.[303] Thus, considerable litigation costs are being generated for works that do not exhibit substantial copyrightable creativity. And to the extent that this litigation

[299] See supra note 133 and accompanying text.

[300] Lemley & McKenna, supra note 63, at 2282; Zahr K. Said, Reforming Copyright Interpretation, 28 Harv. J.L. & Tech. 469, 519 (2015).

[301] Architectural Works Copyright Protection Act of 1990, Pub. L. No. 101-650, §§ 701–06, 104 Stat. 5089, 5133 (codified at 17 U.S.C. § 101 note (2012)).

[302] Shipley, supra note 187, at 4–5.

[303] See, e.g., Nelson-Salabes, Inc. v. Morningside Dev., 284 F.3d 505, 508–11 (4th Cir. 2002) (lawsuit for copyright infringement for design of assisted living facility); Shipley, supra note 185, at 6.

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produces systematic over-protection, it can generate considerable competition costs without significant incentive benefits.[304] Second, and more importantly, architectural works, and especially the most non-functional works, are not subject to substantial incentive costs. There is not much of a market for knock-offs of designs by Frank Gehry and I.M. Pei. Most of the customers for highly aesthetic architecture want novel designs and are willing to pay for them.[305] Accordingly, a Filtering regime for architectural works seems to make little sense. To the extent that U.S. copyright law must protect buildings, a Threshold approach that only protected the most non-functional buildings would be optimal.[306]

Copyright law's use of Exclusion screens for culinary works, perfumes, and yoga routines seems consistent with our analysis for when such a screen is most valuable. In each of these areas, distinguishing non-functional from functional content is likely to be challenging, either for administrators or for juries. And in many cases, works will have numerous design features that simultaneously involve aesthetic and functional considerations, making analysis even harder.[307] Most importantly, though, these fields do not appear to be suffering from

[304] See Collins, supra note 188, at 14–16.

[305] See Christopher Buccafusco, Stefan Bechtold & Christopher Jon Sprigman, The Nature of Sequential Innovation, 59 Wm. & Mary L. Rev. 52, 54 (forthcoming 2017) (draft on file with authors).

[306] It is important to note that the scale of the competition costs associated with protecting some works that do not merit copyright protection could be blunted by alterations to the scope of the protection offered. In general, copyright law protects not just against perfect copies of a work but also against substantially similar copies of a work. See Nichols v. Universal Pictures Corp., 45 F.2d 119, 121 (2d Cir. 1930) ("It is of course essential to any protection of literary property, whether at common-law or under the statute, that the right cannot be limited literally to the text, else a plagiarist would escape by immaterial variations."). This gives rightsholders far broader protection. But, if copyright law wanted to let many works into the field but to nonetheless protect them very narrowly, it could simply grant them a more limited scope. For example, works receiving only thin copyright protection would only be protected against verbatim copying. See, e.g., Satava v. Lowry, 323 F.3d 805, 812 (9th Cir. 2003) (holding that plaintiff's thin copyright on his sculpture does not extend to cover defendant's similar sculpture).

[307] See, e.g., Kim Seng Co. v. J & A Imps., 810 F. Supp. 2d 1046, 1053 (C.D. Cal. 2011) (explaining that the functionality of the food in plaintiff's dishes was inseparable from their original expression).

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substantial incentive costs due to under-protection.[308] The lack of formal legal protection for culinary creativity, for example, does not seem to have limited new works and new investment in the field. And the existence of knock-off perfumes does not seem to have dampened creative activity there either. Thus, given the high risks to competition if creators use copyright law to protect functional aspects of these sorts of works, their complete exclusion from copyright protection is justified.[309]

As always, the final functionality screen, Threshold, is trickier to analyze. Above we indicated that Threshold works best when a large percentage of works in a class should be excluded from the protection entirely without having to expend the costs associated with Filtering at the litigation stage. This was Congress's intention when it drafted the useful articles doctrine.[310] Works that are the product of industrial design rather than applied art are not appropriate for copyright protection and should be channeled into the design patent regime.[311] The threshold that copyright law applied to PGS works prior to *Star Athletica v. Varsity Brands* was intended to accomplish this task.

The 1976 Act lumps together all PGS works,[312] but obviously the incentives and markets that apply to fine art paintings differ considerably from those that apply to garment and flatware design. Paintings occupy a position on the far left of our spectrum. Accordingly, they generate little in the way of competition costs, because painters are rarely able to prevent utilitarian uses through copyrights. Thus, Filtering seems to work well for these sorts of works. And because all paintings have some meaningful expression in them, ex ante administrative review for functionality will be needlessly costly. At the other end of the spectrum, garment designs are largely functional, and even their few

[308] Kal Raustiala & Christopher Sprigman, The Knockoff Economy: How Imitation Sparks Innovation 9–10 (2012); Christopher Buccafusco, Making Sense of Intellectual Property Law, 97 Cornell L. Rev. 501, 548 (2012); Buccafusco, supra note 177, at 1149–55.

[309] We suspect that some might argue that a functionality threshold for works with a very high ratio of aesthetic to functional content would be appropriate for culinary creativity. This could certainly be true if such works face significant incentive costs due to under-protection.

[310] H.R. Rep. No. 94-1476, at 55 (1976), *reprinted in* 1976 U.S.C.C.A.N. 5659, 5668.

[311] Jason J. Du Mont, A Non-Obvious Design: Reexamining the Origins of the Design Patent Standard, 45 Gonz. L. Rev. 531, 588 (2009/10).

[312] 17 U.S.C. § 102(a) (2012).

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non-functional features are often inherently tied to functional considerations like affecting the appearance of the wearer.[313] Allowing garment designers to protect their works with copyrights could, therefore, have substantial effects on competition for functional features.

Unfortunately, the Supreme Court decision in *Star Athletica* seems to undermine the use of Threshold screens for PGS works.[314] The original plaintiff, Varsity Brands, produces uniforms that are largely composed of functional and dual-nature features. Some of the latter features, including color blocking, chevrons, and stripes, influence the way that the uniform wearers appear.[315] The designs are intended to make wearers look attractive, slimmer, and more athletic. Allowing Varsity Brands to gain copyright protection for these features would compel other designers to produce uniforms that were less appealing to purchasers—ones that made them look less attractive. This would provide Varsity Brands with the sort of competitive advantage that is only supposed to come from patent law.[316] Nonetheless, the Court quickly passed over the Threshold inquiry, blithely concluding that a work was entitled to protection as long as the non-functional elements could be imagined as a creative rather than a functional work.[317] The Court even went so far as to hint that beyond that minimal threshold it might do no further filtering,[318] though we think a more reasonable reading of the case is that courts must still find some way to separate functional from non-functional elements, presumably under some form of Filtering regime.

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[313] Buccafusco & Fromer, Fashion's Function, supra note 78, at 1–2.

[314] 137 S. Ct. at 1005.

[315] Buccafusco & Fromer, Fashion's Function, supra note 78, at 2; Marchese, supra note 155, at 136–37.

[316] Brief for the Petitioner at 12, *Star Athletica*, 137 S. Ct. 1002 (2017) (No. 15-866) ("Respondent Varsity is the world's largest manufacturer and distributor of cheerleading and dance-team uniforms and accessories, commanding 80% or more of the roughly $300 million cheerleading-apparel market."); Brief Amicus Curiae on Behalf of Intellectual Property Professors in Support of Petitioner at 26, *Star Athletica*, 137 S. Ct. 1002.

[317] *Star Athletica*, 137 S. Ct. at 1010 ("The first requirement—separate identification—is not onerous. The decisionmaker need only be able to look at the useful article and spot some two- or three-dimensional element that appears to have pictorial, graphic, or sculptural qualities.").

[318] Id.

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We think this is a significant step backward in the clarity—and correctness—of the law. The use of a Threshold for PGS works accommodated the differences between media with respect to their need for the particular incentives copyright law offers. Copyrights last for an incredibly long time. The value of a painting is often only revealed over the course of many years or decades, so the long term of protection makes the most sense here.[319] Industrial designs for products, however, change rapidly and quickly go out of fashion. Within only a few years, the trends that were popular for clothing, fashion, and product design will have changed, and their creators will have moved on.[320] The long copyright term is unnecessary for such works.[321] Accordingly, the Threshold-like features of the useful articles doctrine helped copyright law deal with the different sets of costs and benefits that protecting the various kinds of PGS works produces. It did so by channeling high-functionality products into the industrial-design regime. But now that copyright and design patent law apply similar functionality screens,[322] channeling will be much more difficult.

The value of a Threshold for PGS works largely emerges from Congress's decision to lump so many different kinds of media together. The challenges of applying the useful articles doctrine would have been largely eliminated had Congress instead chosen to split up different classes of works according to the most appropriate functionality screen. Paintings could have been assigned to a Filtering screen, and industrial design could have been assigned to an Exclusion screen. Such a solution might have the additional benefit of minimizing the risks of determining where the threshold should apply. Instead of having to guess whether Congress intended to protect a given work based on its relationship to the threshold, courts could simply classify it and know immediately

[319] This is not to say that it actually makes sense, just that to the extent that it makes any sense it does so here.

[320] See Kal Raustiala & Christopher Sprigman, The Piracy Paradox: Innovation and Intellectual Property in Fashion Design, 92 Va. L. Rev. 1687, 1718–34 (2006) (arguing that the lack of IP protection for fashion tends to both enable trends and speed up their obsolescence).

[321] The same can be said for other high-functionality copyrighted works like computer software.

[322] Compare Figure 11 and Figure 16, supra (showing how protection differs).

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which screen applied. They may have little choice but to do so now that *Star Athletica* has opened the floodgates to protection for virtually any form of useful article, no matter how functional.

2. Trademark Law

As we explained above, trademark law adopts a modified version of Filtering screening that also bears some similarity to copyright's approach to useful articles.[323] When features of trade dress serve both source-identifying and functional purposes they are excluded from protection. It is not surprising that trademark law broadly excludes functional works from protection. While both copyright and design patent law exist in order to protect expressive elements, trademark law does not.[324] In trademark law, we are not concerned with producers generating new and creative marks. We simply want them to be able to signal product source in a reasonably efficient way that does not otherwise influence or limit competition.

It is true that the shape or color of a product can sometimes serve to identify its source, but product configuration is rarely, if ever, the primary means brands use to convey identity. [325] Even iconic shapes like the classic Coca-Cola bottle are almost always paired with word and packaging marks that prominently indicate source. So the cost of false positives for functionality seems particularly low in trademark law. There is relatively little incentive risk associated with under-protecting aspects of trade dress that are actually source-identifying, because the producer can often simply shift to other marks that work just as well. Even if product shape or color are relatively efficient methods of conveying source information, there are always other options available to producers.

[323] See supra Section III.B.

[324] Trademark law protects consumers against confusion in the marketplace. See supra note 197 and accompanying text.

[325] See, e.g., Glynn S. Lunney Jr., The Trade Dress Emperor's New Clothes: Why Trade Dress Does Not Belong on the Principal Register, 51 Hastings L.J. 1131, 1164 (2000). On branding as something broader than simply protection of source affiliation, see Desai, supra note 270, at 983; see also Deven R. Desai, The Chicago School Trap in Trademark: The Co-Evolution of Corporate, Antitrust, and Trademark Law, 37 Cardozo L. Rev. 551, 604 (2015) (discussing the ways brands convey identity).

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By contrast, the cost of false negatives for functionality is significantly higher, because granting trade dress protection to a functional product design would give one party perpetual control over a design. This produces substantial competition costs when other parties do not have good substitutes for the functional feature. There are also significant administrative costs that come from trademark law's decision to treat functionality as a question of fact, at least beyond the threshold determination.[326] Because incentive costs from mistakes are low, whereas competition costs from mistakes are high, trademark law is wise to engage in substantial ex ante screening and to use a rigorous Filtering screen that prevents trade dress from covering useful features of products. Trademark law takes a more moderate position when it comes to aesthetic functionality, however, allowing trade dress protection for attractive features so long as good alternatives remain available. This too makes some sense, as the costs of false negatives are lower—merely depriving the public of something that looks good rather than something that actually works better.

Given the particularly low incentive costs associated with under-protecting non-functional trade dress, however, we are tempted to go a step further and advocate outright Exclusion for all trade dress.[327] Almost all features of trade dress will contain at least some degree of either utilitarian or aesthetic functionality that will give the rightsholder competitive advantage. If the costs of switching to word or graphic marks to convey source instead is virtually zero, if the risk to competition is significant, and if the PTO and courts are investing substantial resources in weeding out good from bad, it might make sense to simply abandon trade dress protection entirely.[328] Europe seems to

[326] For discussion, see generally Yvette Joy Liebesman, Rethinking Trademark Functionality as a Question of Fact, 15 Nev. L.J. 202 (2014) (arguing that functionality determinations should not be factual determinations made by juries, rather legal conclusions decided by judges).

[327] True, companies often spend money to try to protect aesthetic trade dress under the Lanham Act. But we suspect they do so primarily for reasons we find suspect—to use trade dress protection to achieve ends that are better suited to copyright or design patent law.

[328] These features are very similar to those present for recipes and yoga poses in copyright law, except that the case for Exclusion is even stronger here because the PTO and courts invest substantial administrative resources reviewing applications. These resources would be saved by simply excluding trade dress protection.

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have moved in that direction recently, severely restricting the availability of trade dress protection for product configurations.[329] Mark owners would instead be required to use word or graphic marks to signal the source of their products, freeing up product design for open competition.

3. Design Patent Law

As we have seen, design patent law doesn't currently use any of the standard mechanisms for screening functionality.[330] Instead, it uses something like a reverse Threshold approach, in which both the functional and ornamental aspects of design get protection unless virtually the whole design is functional.[331] As a functionality screening mechanism, this approach does not make much sense. It seems to defeat the purpose of having a functionality doctrine, because it gives design patent owners the ability to do exactly what the functionality doctrine is supposed to prevent: leverage their design patents to control functions.

Given our analysis of the value of different sorts of functionality screens, we can determine what the market for designs would have to look like in order to justify such an approach. Design patent law allows patentees to claim all of the non-functional features of their designs as well as all or most of the functional aspects of their designs when they also include non-functional elements.[332] This would make sense if policy makers were convinced that industrial design suffers from enormous incentive risks if under-protected and virtually zero competition risks if over-protected. This assumes that designers will not create new product designs unless given substantial IP incentives to do so and that allowing

[329] See, e.g., Case C-30/15 P, Simba Toys v. European Union Intellectual Prop. Office (May 25, 2016), http://curia.europa.eu/juris/document/document.jsf?text=&docid=178681&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=315233 [https://perma.cc/3QSA-89QC] (denying trade dress protection for the Rubik's cube); Case C-205/13, Hauck GmbH v. Stokke (May 14, 2014), http://curia.europa.eu/juris/document/document.jsf?text=&docid=152243&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=316842 [https://perma.cc/8W2D-7Z28]; Societe des Produits Nestle SA v. Cadbury UK Ltd., [2016] EWHC 50 (Ct. Ch. U.K.).

[330] See supra notes 232–32.

[331] See id.

[332] See supra notes 231–34.

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those designers to claim rights will not substantially hinder the interests of other designers and the public. We seriously doubt these assumptions hold true, and we suspect that all objective thinkers do also.

A better approach for design patents would be a normal Threshold approach akin to that applied in copyright law to useful articles, the closest analog to designs. Such an approach would forbid protection altogether to design elements that are largely functional, such as the floating pontoons in the *Sport Dimension v. Coleman Co.* case,[333] while allowing protection for designs that incorporate significant ornamental elements. It would not, however, permit design protection to control the functional aspects of a product, as the law currently does. In addition, functionality should be redefined, consistent with every other area of law, not to mean that there is no available alternative, but to encompass elements that contribute to the cost or quality of the product.

A Threshold approach rather than Exclusion makes sense for design patents because their point is to protect the ornamental aspects of utilitarian articles. We want to encourage design creativity. At the same time, a pure Filtering approach, while better than what we have today, risks allowing too much control over function for a system that as a practical matter does very little ex ante assessment of protectability. We might set the threshold early, during the patent examination process, by amending the statute to require the patentee to affirmatively demonstrate non-functionality, as we do in trade dress law.[334]

D. Improving the Screening Process

The application of different functionality screens is generally (though not necessarily) related to the choice of decisionmaker. Courts generally give Filtering to the jury, but apply Exclusion and Thresholds themselves.[335] This is because determining the scope of rights occurs as a matter of infringement with Filtering, while it tends to arise as a matter of validity with Exclusion and Thresholds.[336] Thus, if we think juries are

[333] See supra notes 235–40.

[334] See supra note 202 and accompanying text.

[335] Lemley & McKenna, supra note 63, at 2268; Fromer & Lemley, supra note 264, at 1266 n.80.

[336] See supra Part II (discussing the nature of different screens).

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more expensive, more error-prone, or both, that argues for use of Thresholds or Exclusion over pure Filtering, because those screens allow judges to take simpler cases out of the hands of the jury, saving money and perhaps producing better outcomes.

Alternatively, we might decouple the choice of decisionmaker from the choice of screen, for instance by allowing judges rather than juries to do some Filtering pre-trial. One of us has argued for just such an approach.[337] Doing so could reduce the administrative costs of both Filtering and Threshold regimes by allowing more screening to occur pre-trial, reducing the cost of litigation. It would also likely increase the accuracy of the result, since juries are not likely to be particularly good at filtering out functional elements, and may not even understand why they are being asked to do so.[338]

Other approaches short of a pre-trial scope proceeding can also help reduce the cost and increase the accuracy of a screening system. For instance, taking a page from the California trade secrets law,[339] a party that seeks to protect a functional work under a Filtering or Threshold regime might be required to identify with particularity the non-functional elements rather than using vague concepts like "total concept and feel" or a combination of overall elements.[340] Doing so could help make Filtering a real tool for narrowing the protection of works to expressive elements pre-trial, and it could also help weed out cases in which there is really not much expressive content at all.

CONCLUSION: ONE SCREEN TO SHIELD THEM ALL?

Do these considerations suggest that one form of screen is better than the others? Not necessarily. IP regimes may differ on several of the dimensions we have discussed. Some IP laws may address works that

[337] Lemley & McKenna, supra note 63, at 2273.

[338] Mark A. Lemley, Our Bizarre System for Proving Copyright Infringement, 57 J. Copyright Soc'y U.S.A. 719, 739 (2010) ("Without the benefit of expert testimony . . . judges and juries are more likely to find infringement in dubious circumstances, because they aren't properly educated on the difference between protectable and unprotectable elements.").

[339] Cal. Civ. Proc. Code § 2019.210.

[340] Roth Greeting Cards v. United Card Co., 429 F.2d 1106, 1110 (9th Cir. 1970).

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are more functional by nature. Even within an IP regime, some types of works will have more functional content than others. The costs of distinguishing expressive from functional content may differ with different kinds of works. And the legal tools we have to work with may differ as well. So it makes sense that the law chooses different screens in different circumstances.

Nonetheless, understanding the various ways in which IP law screens functionality is valuable. First, understanding the costs and benefits of different approaches helps justify the otherwise-perplexing treatment of functionality in many IP cases. Copyright's hybrid use of Filtering, Thresholds, and Exclusion makes more sense when put in the context of the different nature of the works involved. So too does trade dress law's often-confusing differential treatment of utilitarian and aesthetic functionality. Second, understanding how and why different regimes screen functionality can identify rules that make little sense and need to change, like the extremely pro-plaintiff rule in design patent cases. It also offers a guide for resolving copyright in useful articles after *Star Athletica*.[341] Finally, our systematic analysis of the costs and benefits of different approaches can help guide the courts toward improving the application of the screens they do use, for example by concentrating Filtering efforts in pre-trial rulings by district judges and requiring the parties to be more explicit about what is and is not being protected.

[341] *Star Athletica*, 137 S. Ct. 1002.