The Problem of Design Patents: Representation and Subject Matter Scope

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Abstract

The design patent system has become incoherent. The system was created in a time when design meant "put[ting] a beautiful wrapper around the idea."[1] The legal system for design protection has become lost in the past. The system should be updated to capture design's creative power as it is exercised in this century. A fundamental shift in design thinking has moved toward solving problems, including those that are aesthetic.

One consistent theme of the current criticisms is the system's inability to affirmatively articulate a cohesive underlying theory governing its subject matter. Recently, one proposal suggests that this could emerge from an analysis of the changes in the design field over the past century. This Article fills that gap. In addition, various proposals are offered that flow from that work to address other troubling concerns. These leverage the strengths of the patent system, including the law's ability to require ex ante disclosure.

Further, this Article explores the semiotics of design patent images, which have an unappreciated impact on their substantive power. Design patents generally use reductive, static figures that show the design's structural outlines, emphasizing line and edge. Text is minimized. The system's default rules allow claims that are represented in their broadest forms and supported with minimal information. This is contrary to the treatment of utility patents, which are purported to be governed by the same rules. Perhaps most troubling, these sparse disclosures have likely impacted the legal system's collective understanding of the possible definitions of design. Although designers have expanded their work to create multisensory experiences, design law has not evolved to consider such aspects as available for protection.

Laws should evolve to serve their primary statutory purpose. By expanding the available formats and appearance of submissions for design patent applications to the United States Patent & Trademark Office ("PTO"), the system can begin a decision-making process that considers the potential range of protection that considers both visual and multisensory forms of design.

I. Introduction

The design patent system has become incoherent. The system was created in a time when design meant "put[ting] a beautiful wrapper around the idea."[2] No longer an afterthought used to embellish a fully engineered product, design has become

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1 Tim Brown, *Design Thinking*, 86 HARV. BUS. REV. 84, 86 (2008).

2 *Id.*

integrated into our social systems based on a human-centered design ethos.[3] As some scholars recognize, "design patent doctrine is in disarray because it is unmoored from any conceptual underpinnings."[4] Those original underpinnings, established in a long-ago era, have lost sight of design's creative power as it has been exercised throughout the past hundred years. Today, the field solves problems by empathetically engaging users using a multidisciplinary approach that requires creative thinking beyond the visual.[5]

The U.S. Patent Act protects any "new, original and ornamental design for an article of manufacture."[6] Written in 1902, this statute uses a term—ornamental—that has virtually disappeared from our colloquial lexicon. Long ago, design required adding visual embellishment to products that had already undergone an engineering process. In contrast, current designs embody solutions to *aesthetic problems*.[7] The results of this process stand in contrast with the functional problem-solving that is the subject of utility patents.[8] The most challenging design problems require grappling with significant indeterminacies.[9] These are targeted to elicit interaction to enhance the user experience, including through appearance, communication of meanings, guiding experiences, and evoking emotions.[10] Such designs use aesthetics that are capable of evoking insight in the user in ways that are perhaps not logical, rational, or capable of being numerically measured.[11] In the process of creating human experiences, designers face include cultural, semantic, and physical constraints.[12]

Congress has not provided a concrete definition for the word "design."[13] The courts have done little to fill it.[14] Limited by administrative rules that derive from a

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3 *Id.*; Cinnamon L. Janzer & Lauren S. Weinstein, *Social Design and Neocolonialism*, 6 DESIGN & CULTURE, 327, 328 (2014).

4 Mark P. McKenna & Katherine J. Strandburg, *Progress and Competition in Design*, 17 STAN. TECH. L. REV. 1, 4 (2013).

5 ANDREW H. DENT & LESLIE SHERR, MATERIAL INNOVATION: PRODUCT DESIGN 9 (2014) ("Today, there is a fluid and pervasive overlap between architecture, identity, fashion, products, packaging, interiors, automobiles, computer interfaces and so on.").

6 35 U.S.C. § 171.

7 *See* discussion at note 177 and accompanying text.

8 35 U.S.C. § 101; 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, 545 n. 33 (2017) ("modern patent law includes a wider range of subject matter than that which 'does something' in the physical, mechanical, or chemical sense").

9 Richard Buchanan, *Wicked Problems in Design Thinking*, 8 DESIGN ISSUES 5, 15 (1992) (discussing design thinking as solving "wicked problems," which are defined as problems that have no definitive solution due to indeterminacies.").

10 Paul Hekkert, *Design Aesthetics: Principles of Pleasure in Design*, 48 PSYCH. SCI. 157, 160 (2006).

11 KRISTINE H. HARPER, AESTHETIC SUSTAINABILITY: PRODUCT DESIGN AND SUSTAINABLE USAGE 123 (2017) (defining aesthetic nourishment).

12 DON NORMAN, THE DESIGN OF EVERYDAY THINGS 115–116 (2013).

13 Sarah Burstein, *The Patented Design*, 83 TENN. L. REV. 161, 230 (2015).

14 Mark P. McKenna, *Fixing Functionality in Design Patent Law*, 36 BERK. TECH. L. J. 195, 208 (2021).

different time, the present system flattens the legal system's conception of design patent creativity. Patent decision-makers must become more familiar with these current design principles to appropriately moor the design patent system of protection.

Scholars have offered numerous criticisms of the law's definitional vagueness.[15] One consistent theme that emerges from this literature is the legal system's failure to affirmatively articulate a cohesive underlying theory of its subject matter.[16] Recently, one article proposed that "there could be significant benefits from clarifying, harmonizing, and unifying design protection in light of the shifts in industrial design theory and practice that have taken place over the past century."[17] This Article fills that gap. Several proposed solutions flow from that analysis.[18] These leverage the strengths of the patent system, including the patent system's ability to require *ex ante* disclosure.

Additionally, this Article considers the semiotics of design patent images, which have an unappreciated impact on their substantive power. They use reductive, static figures that show the design's structural outlines, emphasizing line and edge.[19] Text is minimized, narrowing the most convenient space for applicants to provide elaboration about their design. Photographs are not consistently reproduced legibly. The PTO's default rules allow claims that are represented in their broadest forms and supported with minimal information. Given that this format has been held adequate by the courts, there is little reason for patentees to submit detailed disclosure with rich information even when they possess it. Perhaps most troubling, these sparse disclosures have impacted the legal system's collective understanding of the *possible* definitions of protectable design. Although designers have expanded their work to encompass aesthetics through multisensory experiences, design law has not evolved to consider protection beyond the visual.

The current rules do not require patentees to isolate and describe the aesthetic aspects of their work to support a design right. This circumstance conflicts with the statutory requirements as they are implemented for utility patents under statutes that purport to govern both. Just as it has done in the utility patent context, asking patentees to provide more robust information about their claims will better serve the public notice function of the patent system.

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15 Peter S. Menell & Ella Corren, *Design Patent Law's Identity Crisis*, 36 BERK. TECH. L. J. 1, 135 (2021) (proposing modifications); Sarah Burstein, *Is Design Patent Examination Too Lax?*, 33 BERK. TECH. L.J. 607, 610–11 (2018); Christopher Buccafusco, Mark A. Lemley & Jonathan S. Masur, *Intelligent Design*, 68 DUKE L.J. 75, 124 (2018); Jeanne C. Fromer & Mark P. McKenna, *Claiming Design*, 167 U. PENN. L. REV. 123, 171 (2018); and McKenna, *supra* note 14, at 197.

16 The U.S. Supreme Court skirted this issue in a recent case between Apple and Samsung and offered no insight into the statutory application to the subject matter. Samsung Elecs. Co. v. Apple Inc., 137 S. Ct. 429, 435 (2016) (referencing the definition for an article of manufacture as "simply a thing made by hand or machine.").

17 Menell & Corren, *supra* note 15, at 136.

18 See Section VI, *infra*.

19 *See* Buccafusco, *supra* note 15, at 134 (discussing the use of black-and-white drawings); Sylvia Ngo, Egyptian Goddess v. Swisa*: Patently Obvious? Reconciling the Ordinary Observer and Point of Novelty Tests*, 10 HOUS. BUS. & TAX L. J. 110, 113 (2010).

Laws should evolve to serve their primary statutory purpose. Among other things, this Article proposes that the system assess patent claims by affirmatively considering whether they purport to cover the 1) ornamental; 2) functional and 3) neither. This filter recognizes that, contrary to the trend in current law, not all design images represent presumptively protectable designs. Rather, some design features may not warrant protection because they do not meet the statute's requirement of ornamentality. To facilitate decision-makers' assessments, patentees should be required to affirmatively define the protectable aspects of their design in their initial applications. Over time, this articulation will provide a reviewable, articulated statement of aesthetics from the patentee. Decision-makers can then assess whether such statements are valid in an ongoing process that will contribute to the legal field's ability affirmatively define an ornamentality standard. More importantly, this test ensures that the rights that are granted are commensurate with the statutory standards.

The law's standard for ornament must become more cognizant of design as it is practiced today. To facilitate this shift, the PTO's rules should be amended to affirmatively permit the submission of alternative media for inclusion in issued design patents, including mixed forms of representation. More robust textual descriptions should be required under a more rigorous application of the statutory requirements. This richer foundation will allow better assessment of the disclosure, novelty, and nonobviousness requirements. To support this solution, as well as to fix ongoing problems, the PTO should fix certain technical problems that interfere with the legibility of the issued design patents under their current practices.

This Article does not question the design patent system's existence. Its working premise is that design protection is worthwhile. Based on these assumptions, it seeks to unite the design field's practices with design patent protection. As background, Part II discusses the historic use of images in patents and an overview of the current rules. Part III considers the historical arc of the agency's rules that were promulgated to promote public notice yet fail to serve that function today. Part IV explores current design practices. Part V examines the *Apple/Samsung* design patent dispute and draws various lessons from that record. Proposed solutions to these problems are discussed in Part VI. Part VII provides some concluding thoughts on the future of the design patent system.

II. Design: Context and Protection

Long before design patent law was adopted in the U.S., a large majority of everyday products were European imports, homemade, or obtained from local craftspersons.[20] Artisan specialists created and supplied such necessities.[21] Individuals

[20] JEFFREY L. MEIKLE, DESIGN IN THE USA 20 (2005); JENNIFER L. ANDERSON, MAHOGANY: THE COSTS OF LUXURY IN EARLY AMERICA 37–38 (2012) (describing these options for furniture); PENNY SPARKE, DESIGN IN CONTEXT 57 (1987).

[21] MEIKLE, *supra* note 20 at 20 (describing that such products included dishes, churns, furniture, blacksmiths, weavers, and others); *see also* ROSEMARY TROY KRILL, EARLY AMERICAN DECORATIVE

combined technical knowledge with the artistic sensibility to custom-design objects from layout to assembly, then finished them with decoration.[22] In Britain, craft guilds professionalized these occupations in ways that prevented outsiders from copying.[23] Because these techniques were labor-intensive, large-scale copying was not a significant concern.

Two trends contributed to a shift in American design: first, there was a significant increase in the U.S. population, and second, new production methods facilitated the widespread availability of designed goods.[24] Worker specialization was implemented to facilitate faster production by those trained to perform a narrow range of tasks.[25] Their individually created parts were then assembled into finished products.[26] These faster, higher-volume production methods opened possibilities for copying.

During the 1800s, design became a freestanding specialty.[27] In a shift from "draftsmanship over craftsmanship," designer's drawings acted as templates for final commercial products.[28] This intellectual work preceded "rote execution," by workers, who applied these instructions using either machinery or hand tools.[29] Consistent with this practice, one Patent Commissioner decision described that "design is merely a delineation of form or figure, either plane or solid—a shape or configuration. The construction of an article following that delineation is the materialization of the conception of design."[30] Design became synonymous with its representation. During the Industrial Revolution, that form of representation was drawing.

A. Visual Representation in the Patent System

The primary way to claim a design right has long been with a static image.[31] The key variables of this analysis concern the amount of information included in the figure, as well as how easy and inexpensive the image is to reproduce.

Some early utility patent laws required inventors to submit an image before the right was granted.[32] These images were solely for examination and were not disclosed

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ARTS, 1620–1860: A HANDBOOK FOR INTERPRETERS at 26–27 (2010) (discussing early America's nascent textile industry).

22 CHARLOTTE FIELL & PETER FIELL, THE STORY OF DESIGN: FROM THE PALEOLITHIC TO THE PRESENT 37 (2018); *see, e.g.*, KRILL, *supra* note 21, at 28; *see also id.* at 10–11.

23 FIELL & FIELL, *supra* note 22, at 37.

24 MEIKLE, *supra* note 20, at 28. For one example of nineteenth century mass production, see Don C. Skemer, *David Alling's Chair Manufactory: Craft Industrialization in Newark, New Jersey, 1801–1854*, 22 WINTERTHUR PORTFOLIO, no. 1, 1987, at 1.

25 MEIKLE, *supra* note 20, at 23; GLENN ADAMSON, THE INVENTION OF CRAFT 26–27 (2013).

26 *Id.* at 10 (describing different specialists needed to assemble furniture that was made from a combination of leather, bronze, and wood).

27 *See* SPARKE, *supra* note 20, at 37; ADAMSON, *supra* note 2520, at 7 (describing that craftspersons' labor was "brought under control through pictorial . . . means").

28 *See id*. at 20.

29 *Id.* at xxi.

30 *Ex parte* Traitel, 1883 Dec. Comm'r Pat. 92, 93, 25 Off. Gaz. Pat. Office 783 (1883).

31 Richardson v. Stanley Works, Inc., 597 F.3d 1288, 1294 (Fed. Cir. 2010).

32 Mario Biagioli, *From Prints to Patents: Living on Instruments in Early Modern Europe*, 44 HIST.

to the public.[33] In some countries, the system's working requirement for issued patents acted as a substitute for detailed disclosure.[34] For example, the Venetian patent system did not routinely require drawings to establish technical feasibility because the inventor was obligated to sell an operational invention.[35] Thus, an invention's use in the market demonstrated that the device worked.[36] In contrast, the Dutch system relied on drawings to assess the patentability of the application and then returned them to the applicant.[37]

Up until the 1850s, British patents were engraved onto vellum scrolls.[38] This engraving process, while expensive, allowed for the reproduction of detailed shading and color, as can be seen in this 1837 image[39] from a utility patent claiming a telegraph:

SCI. 139, 152–153 (2006).

33 *Id.*

34 Mario Biagioli, *Patent Republic: Representing Inventions, Constructing Rights and Authors,* 73 SOC. RES. 1129, 1134 (2006) ("The deadlines for reduction to practice or working requirements functioned as de facto technical examinations—even if slightly delayed.").

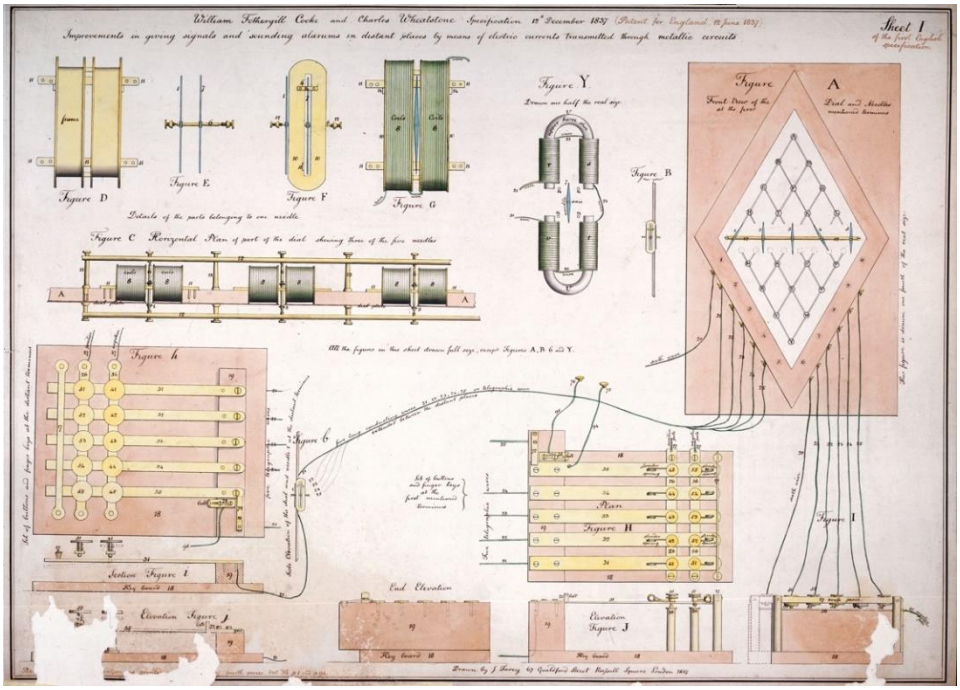
35 *Id.* at 1134.

36 *Id.*

37 Biagioli, *supra* note 32 at, 152–153.

38 E-mail from Rupert Lee, Bus. & Intell. Prop. Ctr., The British Library to Professor Amy L. Landers, Drexel Univ. Kline Sch. of Law (July 29, 2020) (on file with author) ("Until 1854, all British patents were engraved in copperplate and printed on vellum scrolls. In 1854, the entire British patent collection was transcribed into a printed format on paper: the job was contracted to the printers Eyre & Spottiswoode Ltd."). Copies of the originals have been archived. *See* The National Archives, Intellectual Property, Patents of Invention § 2.2 at https://www.nationalarchives.gov.uk/help-with-your-research/research-guides/patents-of-invention/; E-mail from Olivia Gecseq, Visual Collections Record Specialist, The National Archives to Prof. Amy L. Landers, Drexel University Kline School of Law (3/30/22)(on file with author).

39 Great Britain Patent No. 7390 (1837) (image from Cooke and Wheatstone's telegraph patent No. 7390); *see* John Liffen, *Revealing the Real Cooke and Wheatstone Telegraph Dial*, SCIENCE MUSEUM (Oct. 21, 2014), https://blog.sciencemuseum.org.uk/revealing-the-real-cooke-and-wheatstone-telegraph-dial/.



The written disclosure of this utility patent described the invention with extensive references to the patent's drawings.[40] Its claims incorporated portions of the figures.[41]

Generally, these colored scrolls were not widely distributed until the 1850s, when the decision was made to publish all British utility patents for broad distribution.[42] The process of converting the older scrolls to mass-produced books required the original images to be re-drawn into simple black-and-white images.[43] Color and shading were removed.[44] An example of a scan of the black and white line image reflecting the same telegraph invention appears here.

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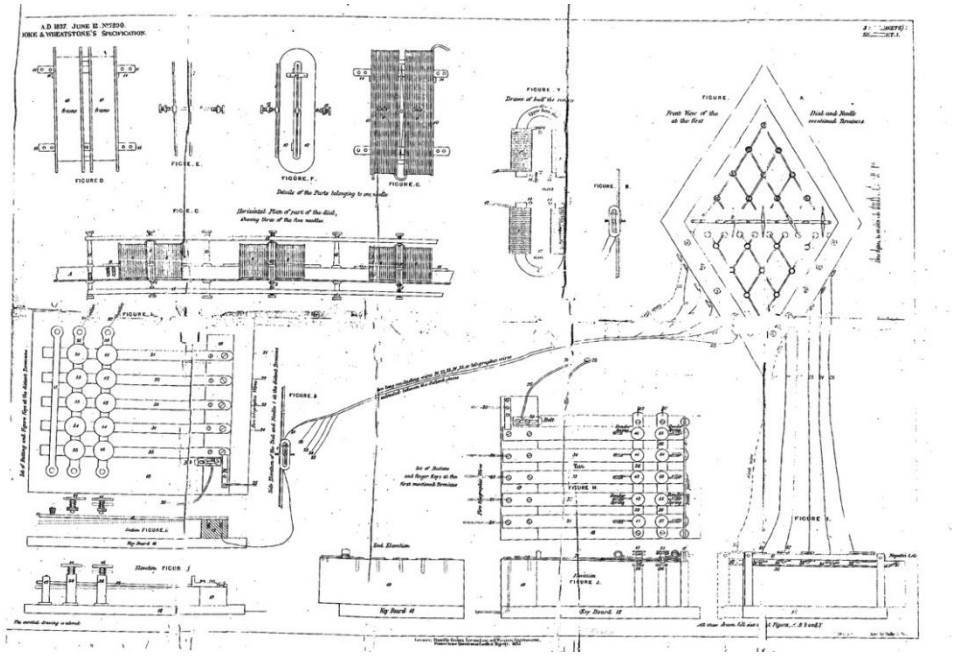
40 Great Britain Patent No. 7390 at 16–39 (1837).

41 *Id.* claims 6–9 on pages 41–42.

42 *See* E-mail from Rupert Lee, *supra* note 38.

43 *Id.* ("In 1854, the entire British patent collection was transcribed into a printed format on paper: the job was contracted to the printers Eyre & Spottiswoode Ltd. The original scrolls were then all destroyed.").

44 *Id.* (from The British Library: "The printers copied the illustrations along with the texts, but this of course means that the illustrations we have are not the originals."); *see also* British Patent No. 548 (1734) (example of a redrawn black-and-white patent reproduction with a legend that states "[t]he enrolled drawing is colored") (copy on file with author).



This simple comparison demonstrates the inarguable proposition that reducing the information in a drawing—here, removing color and shading—conveys less about the invention. The shape of the components has been flattened. The color that played a role in visually organizing the invention is gone. For example, in the color version, brown depicts base components and yellow for those made of metal. This information is lost in the black and white version. In other words, the simpler visual representation possesses less information that is helpful in the full-color version.

As another example, this drawing from an issued U.S. design patent is typical for a modern design patent.[45] As background, the design patent system protects features like surface decoration or the creative form of a product, such as the unique shape of a whistle.[46] Just as with utility patents, design patents are subject to statutory requirements for their validity, including novelty, disclosure, and nonobviousness.[47] Design applicants must provide adequate disclosure and a definite claim.[48] The USPTO performs the task of examining design patent applications and promulgates rules regarding the form that such applications must take.[49] In other words, design

45 U.S. Design Patent No. D776,554, figs. 1 & 4 (filed Jan. 17, 2017).

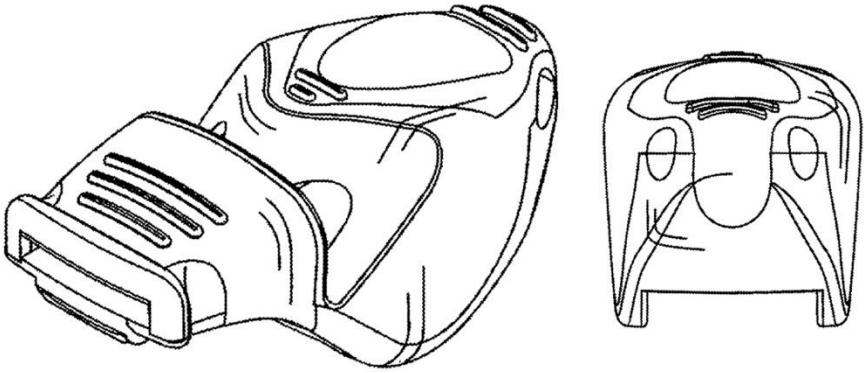
46 *See* Sarah Burstein, *The "Article of Manufacture" in 1887*, 32 BERK. TECH. L.J. 1, 8 (2017)

47 35 U.S. Code § 171(b); OddzOn Prod., Inc. v. Just Toys, Inc., 122 F.3d 1396, 1405 (Fed. Cir. 1997) (novelty).

48 *In re* Maatita, 900 F.3d 1369, 1375 (Fed. Cir. 2018) (novelty); *see also id.* at 1404 (nonobviousness).

49 37 C.F.R. 1.84 (2021).

patent images have "decisive importance" in defining the scope of the legal right.[50] They are intended to depict a protectable work claimed by the designer.[51] Here, the black and white line drawings depict the product's edges and little else:



The drawings flatten the whistle's dimensionality, making it difficult to read. In the image on the left, it is unclear whether some of the lines are meant to represent areas that are convex or concave. Does the image on the right include flattened surface decoration? It is not clear what the lines arcing from each bottom corner are intended to convey. It is not clear what the image on the right conveys. Below, photographs of this whistle fill in this information.

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[50] Richardson v. Stanley Works, Inc., 597 F.3d 1288, 1294 (Fed. Cir. 2010). Curver Luxembourg, SARL v. Home Expressions Inc., 938 F.3d 1334, 1341 (Fed. Cir. 2019) ("courts typically look to the figures to define the invention of the design patent"); *In re* Maatita, 900 F.3d 1369, 1375 (Fed. Cir. 2018); *see also* Rebecca Tushnet, *The Eye Alone Is the Judge: Images and Design Patents*, 19 J. INTELL. PROP. L. 409 (2012); Pac. Coast Marine Windshields Ltd. v. Malibu Boats, LLC, 739 F.3d 694, 702 (Fed. Cir. 2014).

[51] Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 148 (1989) (stating that "[t]o qualify for protection, a design must present an aesthetically pleasing appearance that is not dictated by function alone, and must satisfy the other criteria of patentability"); Ethicon Endo-Surgery, Inc. v. Covidien, Inc., 796 F.3d 1312, 1328 (Fed. Cir. 2015).

These photographs of the claimed whistle more legibly show the whistle's contours, dimensions, and textures. The left image shows the whistle's dimensionality and form. The right image translates the lines into the contoured back of a whistle. It is easier to ascertain the overall form from the surface. The circular shapes on the right image are shown to be holes for a ring to connect to a lanyard. The arcs translate to a change in the surface's shape. The materials—the smooth plastic and the matte rubber—can be discerned. Of the two representations, the second photographic versions disclose more useful information:

The design patent system, which allows the black-and-white line drawing to represent the claim, should aim toward more complete disclosures. Yet these examples demonstrate that spare black and white drawings are both difficult to interpret and do not provide decision-makers with sufficient information to assess patentability.

For utility patents, images that lack legibility are less troubling because missing information is traditionally disclosed in text. Because that system requires a more rigorous application of the disclosure requirements, the relevant field can learn about the technology underlying the claimed invention without legible images.[52] Separately, utility patents do not need to rely on mages or the written specification to define their legal scope. Rather, such patents end with one or more textual claims.[53] The current design patent system, which places primary emphasis on the image, is in comparatively more urgent need of reform.

B. The Early Framework

Beginning in the 1840s, the U.S. considered granting legal protection for designs

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[52] 35 U.S.C. § 112(a); Amgen, Inc. v. Chugai Pharm. Co., 927 F.2d 1200, 1202 (Fed. Cir. 1991); 3 CHISUM ON PATENTS § 7.03 (2021).

[53] 35 U.S.C. § 112(b); 3 CHISUM ON PATENTS § 8.03 (2021).

like that available abroad.[54] By that time, Britain had enacted a handful of laws that covered narrow classes of designs.[55] To some degree, these acts influenced the U.S. design patent system once one was enacted.[56] However, some differences existed. For example, the British 1839 Designs Registration Act relied on a registration system.[57] This required a drawing rather than the submission of a model.[58] Reducing these designs to paper allowed the rights to be "classified, measured and communicated."[59] This procedure laid the foundation to set design law on a course where the paper versions of these designs were, some years in the future, reproduced, searched, and distributed to further the public notice requirement.

Over the next few years, Britain replaced these statutes with broader legislation that retained the requirement for a representative drawing.[60] To obtain the right, the applicant was required to send copies of the drawing to the Design Registry with some identifying information and explanatory text.[61] One example of a successful registration is this 1844 parasol design:[62]

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54 HENRY L. ELLSWORTH, 1942 REPORT FROM THE COMMISSIONER OF PATENTS, 27th Cong., 2d Sess. (reprinted in S. REP. No. 169, 1, 2 (1842) (observing that "Other nations have granted this privilege, and it has afforded mutual satisfaction alike to the public and to individual applicants").

55 27 Geo III, c.38 (1787) (Eng.). The Calico Printers Act extended protection to "[e]very person who shall invent, design and print or cause to be invented, designed and printed and become the proprietors of any new and original pattern or patterns for printing linens, cottons, calicos or muslin . . . ."; *see also* 38 Geo III, c.71 (1798) (Eng.) (titled "An Act for encouraging the Art of making new Models and Casts of Busts, and other Things therein mentioned"); 2 Vict., c. 17 (1839) (Eng.); Ornamental Designs Act 1842, 5 & 6 Vict., c. 100 § 3 (1842) (Eng.).

56 Ornamental Designs Act 1842, 5 & 6 Vict., c. 100 § 3 (Eng.), and Design Registration Act 1839, 2 Vict., c. 17 (Eng.), and Copyright of Designs Act, 1839, 2 & 3 Vict., c. 13 (Eng.); Jason J. Du Mont, *A Non-Obvious Design: Reexamining the Origins of the Design Patent Standard*, 45 GONZ. L. REV. 531, 542 n. 58 (2009) (noting that the first U.S. design patent law's text appears to be a blend of Britain's statutes for the protection of design).

57 Design Registration Act 1839, 2 Vict., c. 17 (Eng.) (requiring that "three copies or drawings" be submitted and at least on copy be indexed); BRAD SHERMAN & LIONEL BENTLY, THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW: THE BRITISH EXPERIENCE, 1760–1911 at 64 (2003).

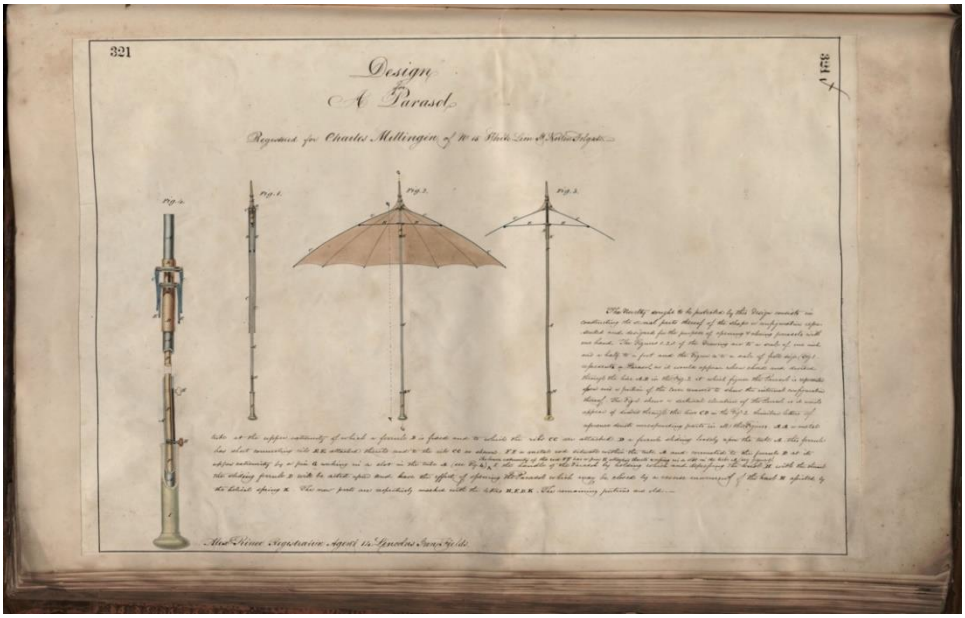
58 38 Geo III C.71 (1798) (Eng.) (titled "An Act for encouraging the Art of making new Models and Casts of Busts, and other Things therein mentioned"); SHERMAN & BENTLY, *supra* note 57, at 73–74 (2003).

59 *Id.* at 72 (describing the registration process).

60 1843 Utility Designs Act, 6 & 7 Vict. c. 65 § 15 (Eng.); 5 & 6 Vict. c. 100 (1843) (Eng.); WILLIAM CARPMAEL, REGISTRATION OF DESIGNS IN ORDER TO SECURE COPYRIGHTS 4 (3rd ed. 1846) (describing the drawing requirement); *see also* Millingen v. Picken, 135 Eng. Rep. 757, 811 (1845) (explaining the relevant legislation).

61 JULIE HALLS, INVENTIONS THAT DIDN'T CHANGE THE WORLD 14 (2014).

62 Useful Registered Design No. 321 BT 45/2/321; see also Millingen v. Picken, 135 Eng. Rep. 757, 760–61 (1845) (discussing this registration).



Notably, the above image has subtle shading and colors, including beige and blue. This drawing would have been placed into a bound volume and indexed.[63] Such drawings were not routinely copied for mass dissemination.[64] Thus, the reproducibility of these images was not a significant concern.

C. Early Forms of Representation

In the early 1840s, then-Patent Commissioner Ellsworth proposed a design patent system for the U.S.[65] Significantly, this proposal suggested that the law would operate "under the same limitations and on the same conditions" as those that existed for utility patents.[66] This suggestion was incorporated into the first U.S. design patent

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63 *Intellectual Property: Registered Designs 1839–1991*, § 3, THE NAT'L ARCHIVES, https://www.nationalarchives.gov.uk/help-with-your-research/research-guides/registered-designs-1839-1991/#6-ornamental-designs-registered-between-1842-and-1883-1884-1885 (describing the indexing system).

64 E-mail from Olivia Gecseg, Visual Collections Rec. Specialist, The Nat'l Archives (UK), to Professor Amy L. Landers, Drexel Univ. Kline Sch. of Law (Jan. 15, 2022) (on file with author).

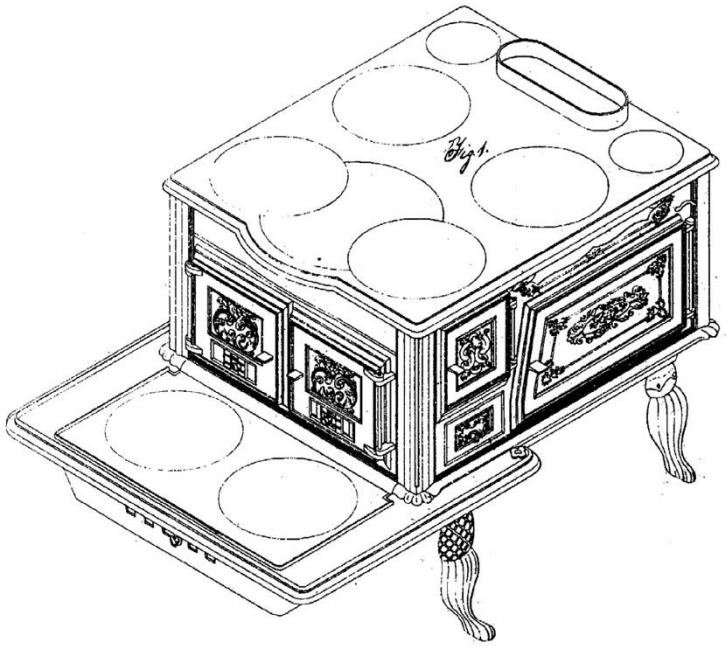
65 Menell & Corren, *supra* note 15, at 109–110. The reasons that Congress chose a patent system (rather than copyright) was chosen is not clear. Some suggestions include that design relates to "manufactured articles of commerce rather than purely intellectual products." Thomas B. Hudson, *A Brief History of the Development of Design Patent Protection in the United States*, 30 J. PAT. OFF. SOC'Y 380, 383 (1948). Another is that this suggestion was expected, given that it was proposed by the patent commissioner. *Id.* It has been suggested that this would have increased needed funding to the agency. Menell & Corren, *supra* note 15, at 10–11.

66 HENRY L. ELLSWORTH, *supra* note 49.

statute, passed in August 1842.[67]

In the agency's earliest days, the public notice function of the patent system was not a pressing concern. Although copies of patents could be requested,[68] it was unclear whether the agency was required to provide them to everyone who asked.[69] A case in point occurred in 1825 when the Patent Office Superintendent refused to provide copies of issued patents to Philadelphia's Franklin Institute, which planned to review the patents and publish assessments of their worth.[70] Unlike today's practice of widely distributing patents, this Superintendent sought to curb the broad dissemination of patent specifications to better protect inventors.[71]

Early courts held that the specification requirement for design patents was satisfied with an image.[72] Yet the form of issued design patents varied widely.[73] Some had very simple, clear lines as in this example, below, which is from an early design patent for a decorative stove.[74]



[67] Act of Aug. 29, 1842, ch. 263 § 3, 5 Stat. 543, 543–44 (1842) (stating that "all the regulations and provisions which now apply to the obtaining or protection of patents not inconsistent with the provisions of this act shall apply to applications under this section").

[68] Patent Act of 1793, ch. 11, 1 Stat. 318, 323 (setting copying fees).

[69] Daniel Preston, *The Administration and Reform of the U. S. Patent Office, 1790-1836*, 5 J. EARLY REP. 331, 341 (1985) (stating that the Patent Office's superintendent's position was that "unexpired patents were confidential.")

[70] *Id.* at 340–41.

[71] *Id.* at 341–42.

[72] Dobson v. Dornan, 118 U.S. 10, 15 (1886); Dobson v. Hartford Carpet Co, 114 U.S. 439, 446 (1885).

[73] Jason Du Mont & Mark D. Janis, *Disclosing Designs*, 69 VAND. L. REV. 1631, 1635 (2016).

[74] U.S. Patent No. D200 (filed Sept. 9, 1848).

In contrast, an 1844 design patent (U.S. Patent No. 20) includes one image of a child's whistle that is considerably less legible.[75] Reproduced here as the best copy available, this patent illustrates the difficulty of clear reproduction using the technology of the day. This drawing's shading around the barrel obscures details such as a shell shape that is barely visible in the middle of the image. In addition, the patent includes a one-page textual description of the whistle's material construction of metal and coral, as well as certain decorative features made of mother of pearl.[76]

Under the law at that time, the text and image were read together holistically to describe the invented design.[77] This description suggests that this design was a mix of distinct textures that contrasted with the luminosity of the mother of pearl. The shading indicates the whistle is a rounded, elongated shape. If the copy were clearer, this patent would have provided far more detail than the modern whistle design patent pictured earlier. A simple two-dimensional line drawing does not depict texture, convex or concave shapes, or the materials used.

For drawings submitted to support utility and design patents, the agency's rules did not particularize their form but only prescribed that they be made "according to the rules of perspective and neatly executed."[78] Significantly, the original design

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75 U.S. Patent No. D20 (filed March 6, 1844).

76 *Id.* at page 2.

77 Booth v. Garelly, 3 F. Cas. 883, 884 (C.C.S.D.N.Y. 1847) (reading the protected design as a combination of the written text in connection with drawings).

78 *See, e.g.*, U.S. Patent & Trademark Office, Information to Persons Having Business to Transact at

patent statute did not require a pictorial representation but allowed figures when "when the nature of the case admits of drawings."[79] Indeed, the first design patent was issued without any drawing at all.[80] By 1845, the PTO's rules adopted procedural requirements specific to design patents.[81] These paralleled the British concept that required representation in either text or drawing, rather than the submission of a model.[82] Specifically, the rules required a "written description or specification" which could be represented by a drawing if the design "admitt[ed] of representation by drawings."[83] These rules included an exemplar design specification that provided little guidance.[84] Over time, design patent drawings became far more common.[85] For a time during the late 1800s, a significant number of design patents relied on photographs.[86]

D. Toward Facilitating Public Notice

The public notice function of patents emerged as an important concern as the 19th century progressed.[87] This trend appeared to have a significant impact on the Patent Office's rules that required more graphically simple forms. As background, in 1844, the House's Committee on Patents reported the need "to diffuse general information, of the same kind among the class of inventors."[88] This report recognized that because all issued patents were kept at the Patent Office in Washington, D.C., inventors had a difficult time ascertaining whether their applications were novel before filing.[89] Further, the 1836 fire that destroyed the existing patent files demonstrated that using a single repository risked a significant loss of knowledge.[90] This report did not result in immediate legislative action.

By 1856, the Patent Commissioner appeared to take matters into his own hands, packing his annual reports to Congress with summaries and drawings from a selected set of issued patents.[91] According to the report, these copies were intended to assist

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the Patent Office 5 (1837), https://hdl.handle.net/2027/uc1.b4262349.

79 Act of July 4, 1836, ch. 357 § 6, 5 Stat. 117, 119 (1836) (containing utility patent disclosure requirements that were incorporated into the design patent statute, *supra* note 62).

80 U.S. Patent No. D1.

81 U.S. Patent Office, Rules of Practice in the United States Patent Office, Art. 6 (1845–46).

82 Unlike the utility patent rules, there was no requirement for a model for U.S. design patent applications. *Id.* at 8, 36.

83 *Id.* at 36.

84 *Id.* at 37.

85 Du Mont & Janis, *supra* note 73, at 1650.

86 *Id.* at 1649.

87 Publication of Patents, 28th Cong., 2d Sess. H.R. REP. NO. 139, at 3 (Feb. 15, 1845) (observing that "informing the public who visit their halls of the nature and progress of the different branches, is not to be lost sight of"); *see also* Phillips v. AWH Corp., 415 F.3d 1303, 1319 (Fed. Cir. 2005) (describing patent's public notice function).

88 Publication of Patents, *supra* note 81.

89 *Id.* at 2.

90 *Id.* at 2–3.

91 U.S. Patent Office, Report of the Commissioner of Patents for the Year 1948: Arts and Manufacture Vol. 1, 30th Cong., 2d Sess., H.R. Exec. Doc. No. 59 (1848) (containing patent summaries); U.S. Patent Office, Report of the Commissioner of Patents for the Year 1856: Arts and Manufacture Vol.

"inventors, mechanics, manufacturers, and others for accurate information of what is being done in the Patent Office."[92] By 1870, this report had expanded to three large volumes and was "very much sought after by the people at large and by inventors all over the country."[93]

The 1870 Patent Act was amended to expressly authorize the agency to copy patents.[94] In 1871, Congress directed the agency to publish the full versions of all patents and to make them available in various locations throughout the U.S.[95] The Patent Office Official Gazette added drawings from utility patents in 1875.[96] The agency prioritized the copying of utility patents for broad distribution.[97] To do so, it promulgated a series of rules that incrementally shifted the patent drawing requirements to optimize them for high-volume lithographic reproduction.[98] The Patent Office had already relied on lithography for other high-volume printing, as well as for the original printings of issued patents.[99] At the time, this technology was imperfect and meant for inexpensive mass distribution.[100] During the late 1800s, lithography was incapable of reproducing the broad range of tonality that was possible from the more expensive and time-consuming engraving system used to print U.S. currency.[101]

At this time, the rules governing both utility and design patent drawings were largely similar.[102] The Patent Office's 1871 drawing rules directed that "[a]ll lines

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3, 34th Cong., 3d Sess. H.R. Exec. Doc. No. 65 (1856) (reproducing patent images).

92 1 U.S. Patent Office, ANNUAL REPORT OF THE COMMISSIONER OF PATENTS FOR THE YEAR 1871 at 9 (1872), https://library.si.edu/digital-library/book/annualreportofco18711unit.

93 CONG. GLOBE, 41st Cong., 3d Sess. 157 (1870) (statement of Mr. Willey); *see also id.* at 156 (noting the expansion of the size of the annual report).

94 Patent Act of 1870, ch. 230, 16 Stat. 198–217 (1870).

95 Joint Resolution Providing for Publishing Specifications and Drawings of Patent Office, H.R.J. Res. 5, 41st Cong., 3d Sess. (1871).

96 *See, e.g.*, U.S. Pat. & Trademark Off., Official Gazette, 525 (July–December, 1975).

97 U.S. Patent Office, Rules of Practice in the United States Patent Office ¶ 19 (1873).

98 *Id.* (introducing the new drawing requirements as patent drawings "will hereafter be prepared by the photo-lithographic process for general distribution").

99 CONG. GLOBE, 41st Cong., 2d Sess. 1133 (1870) (describing the Patent Office's use lithography); CONG. GLOBE, 41st Cong., 1st Sess. 487 (1869) (discussing using photolithography to replace draftsmen at the Patent Office to reduce costs); 5 CONG. REC. 1229, 1241 (1877) (statement of Mr. Hubbell).

100 *See Ex parte* Aumonier, Dec. Comm'r Pat. 77, 63 Off. Gaz. Pat. Office 1815 (1893) (decision of the Patent Commissioner, which recognized that photographs could not be legibly produced using the current photolithography techniques); Helena E. Wright, *Photography in the Printing Press: The Photomechanical Revolution*, *in* PRESENTING PICTURES 21, 32–33 (2004) (discussing subsequent technical developments in the half-tone process, which created the illusion of tonality); DUSAN C. STULIK & ART KAPLAN, HALFTONE 8 (2013) ("halftone image making and printing was always viewed as a reproduction process for the mass production of photographic images"), https://www.getty.edu/conservation/publications_resources/pdf_publications/pdf/atlas_halftone.pdf.

101 Franklin Noll, *The United States Monopolization of Bank Note Production: Politics, Government, and the Greenback, 1862–1878*, 13 AM. NINETEENTH CENTURY HIS. 15, 18 (2012).

102 *See, e.g.*, U.S. Patent Office, Rules of Practice in the United States Patent Office ¶ 83 (1871)

must be clear, sharp, well-defined, not too fine, and *perfectly black*."[103] The agency's rules prohibited "[b]rush-shading, tinting, and imitation surface-graining," and warned against using "heavy shadows, where they would obscure lines or letters of reference."[104] Subtle visual detail would have been out of the question. These rules prohibited the depiction of texture, undoubtedly because it would have been difficult for the rudimentary lithographic reproduction system to handle.[105] For a time, the agency prohibited the description of materials in design patents.[106] This was contrary to utility patents, where such descriptions were required to meet patent law's enablement requirement.[107]

The Patent Office's 1880 Rules advised applicants of the agency's intent to publish and distribute patents nationwide, as well as to publish images in the Official Gazette.[108] In addition, they increased specificity about the type of ink to be used, as well as requiring the use of "pure white paper" of a particular size and minimum margin size.[109] Shading was allowed to illustrate convex or concave surfaces, and the rules advised that "light is always supposed to come from the upper left-hand corner, at an angle of 90 degrees."[110] Regarding photographs, the agency freely accepted photographs to represent designs until 1885.[111] Because photographs typically contain grayscale tones, they would have been challenging to reproduce using lithography as it existed at the time.[112] By the end of the nineteenth century, the Patent Office enacted a rule that required applicants to demonstrate that their design could not be adequately represented in line drawings before accepting any photographs.[113] For the decades that followed, patentees submitted photographs on a very limited basis.[114]

By 1893, the Patent Office Gazette began to reproduce design patents for public

(requiring that design patent drawings conform to the utility patent drawing rules); U.S. Patent Office, Rules of Practice in the United States Patent Office ¶ 83 (1878) (same).

103 U.S. Patent Office, Rules of Practice in the United States Patent Office ¶ 19(3) (1871) (emphasis in original).

104 *Id.* ¶ 19(4).

105 *Id.*

106 U.S. Patent Office, Rules of Practice in the United States Patent Office, § 84 (1903); *see also* U.S. Patent Office, Rules of Practice in the United States Patent Office, § 84 (1897) (stating that "reference to the materials used or the mode of their utilization in the construction of the article to which the design is applied, or the mechanical construction of the article, cannot properly enter into the description of the design.").

107 35 USC § 112; 3 CHISUM ON PATENTS § 7.03 (2021).

108 U.S. Patent Office, Rules of Practice in the United States Patent Office, Sec. 50 (1880).

109 *Id.*

110 *Id.*

111 U.S. Patent Office, Rules of Practice in the United States Patent Office, §§ 81, 82 (1885).

112 *Ex parte* Aumonier, Dec. Comm'r Pat. 77, 63 Off. Gaz. Pat. Office 1815 (1893) (quoting then-current Rule 83 governing the submission of drawings and explaining that "[p]hotographs, generally speaking, do not fulfill these requirements, and it is only in exceptional circumstances, therefore, that they will be admitted").

113 *Id.* At this time, the patent office's chief draftsperson made the determination whether a photograph might be used.

114 Du Mont & Janis, *supra* note 73, at 1650.

distribution.[115] At the end of the 19th century, the Patent Office began to actively discourage the use of text to describe the claimed design.[116] The amount of text in design patent applications dropped dramatically thereafter.[117] Relying on a significant amount of text to describe the invented design or the suggested materials is considered unusual today.[118] In the absence of specific information in the patent, claims are deemed to apply broadly to any implementation that used the same form or structure regardless of color, texture, or materials used in their creation.[119]

Formerly, the agency permitted multiple design claims that described detailed elements similar to those used in utility patents today.[120] Over time, the rules guided applicants to use claim language limited to a description of the final product and the words "as shown and described."[121] As part of this trend, the form of design patents began to rely heavily on black and white line figures, rather than written text.[122] This reliance on a graphically simple image to define the scope of the design right persists today.[123]

E. The Reductive Representation

In service to the public notice requirement and limited reproduction capability, the agency's default rules appeared to encourage applicants to use simple black and white line-drawn images. Generally, the legal scope of a design patent rests on its drawings and written text, the latter typically being scant.[124] Thus, drawings served a primary role to define the scope of the right.[125] For design patents, this shift toward simplification reduced the overall level of information available in design patents, such as the type of materials used to implement the design. The structural edges of the design became the primary visible attribute.

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115 *See, e.g.*, U.S. Patent Office, 1 Official Gazette 153 (Jan. 3, 1893).

116 Du Mont & Janis, *supra* note 73, at 1643.

117 *Id.*

118 *Id.* at 1634.

119 *In re* Hall, 69 F.2d. 660, 661 (C.C.P.A. 1934); *Ex parte* Weinberg, 1871 Dec. Comm'r Pat. 244; *Ex parte* Niedringhaus, 1875 Dec. Comm'r Pat. 22, 7 Off. Gaz. Pat. Office 171 (1875).

120 One example is U.S. Design Patent No. D11,208 cl. 1 (filed Feb. 25, 1879), which states:

> A design for a rubber mat, consisting of a series of parallel corrugations, depressions, or ridges, arranged in sections, the general line of direction of the corrugations in one section making angles with or being deflected to meet those of the corrugations in the contiguous or other sections, substantially as described.

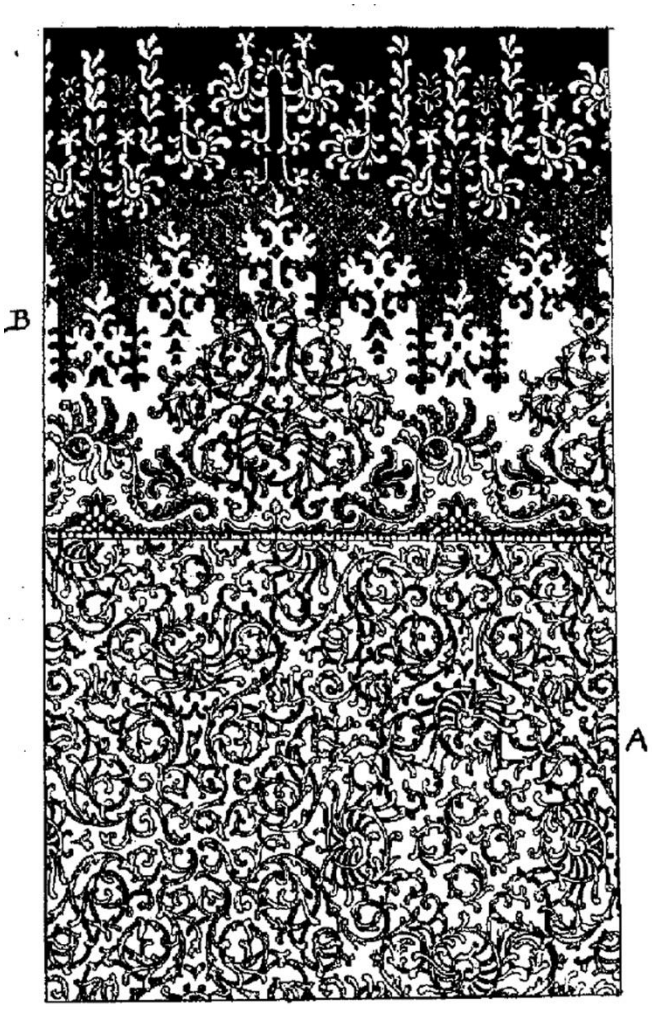
121 *Id.*; U.S. Patent Office, Rules of Practice in the United States Patent Office § 72 (1897).

122 Du Mont & Janis, *supra* note 73, at 1643–44.

123 37 C.F.R. § 1.153(a) (prohibiting more than a single claim, requiring that any design patent claim "shall be in formal terms to the ornamental design for the article (specifying name) as shown, or as shown and described. More than one claim is neither required nor permitted."); Du Mont & Janis, *supra* note 73, at 1649.

124 New York Belting & Packing Co v. New Jersey Car Spring & Rubber Co., 137 U.S. 445, 450 (1890) (the design patent's description of a mat which produced a "sort of kaleidoscope effect" was constrained the size and configuration pictured in the patent).

125 *See Ex parte* Gérard, 1888 Dec. Comm'r Pat. 37, 39–40, 43 Off. Gaz. Pat. Office 1235, 1235–36 (1888).



One early example of the interpretation of such drawings is the 1897 *Whittall v. Lowell Mfg. Co.*[126] This court considered a design patent for a carpet represented by a drawing that included an area with different background shading, including dark gray.[127] Despite the patentee's argument that the shading variation was the primary feature of the design, the *Whittall* court explained that the conventional interpretation of shaded drawings is to ignore such differences and focus on the solid black lines.[128] Finding that the "three shades are accidental features of the drawing," the drawing was construed to claim the outlined scrolls only.[129] As the opinion stated, "[a] black

[126] Whittall v. Lowell Mfg. Co., 79 F. 787, 790 (1897).

[127] *Id.* at 791 (observing that "colors of any character may be employed to render the design, without affecting its essential character."). *See* U.S. Design Patent No. D 24,021 (filed Jan. 16, 1895).

[128] *Whittall*, 79 F. at 789.

[129] *Id.* at 792.

and white drawing for a design is, so to speak, a blank form, into which may be filled a great variety of arrangements or effects of color or shades, without affecting the patented design."[130]

These circumstances created disincentives against the disclosure of rich, informative, detailed drawings and descriptions. Such elements allow a more precise correlation between the design that was envisioned by the designer and the design right. Significantly, using a two-dimensional line drawing disappears informational detail. Aesthetic features that are difficult to fit into this format are largely omitted. Against this background, the PTO's default rules have narrowed the intellectual property system's understanding of design patent subject matter. Coupled with a tradition that arose from utility patent drawings dependent on a rudimentary reproduction technology, this system constrained the potential subject matter that *can* be claimed by designers. For example, rather than surface treatments and form, designers concerned about sustainability are exploring using biomaterials.[131] Such materials are integral to the final product's appearance and texture in subtle and non-repeatable ways.[132] Although attributes of such designs are protectable under utility patent law, it would be difficult to capture the subtlety of these biomaterial-driven products for their aesthetic attributes. The legal system has not considered features that cannot be represented, and therefore those attributes are omitted from the system's understanding of what design is.

F. Current Design Patent Representation Practices

Although printing and electronic display technology have improved immeasurably since the nineteenth century, the patent disclosure rules have advanced only incrementally. Today, at least one drawing is required.[133] The current rules continue to focus heavily on the image to define the patent's scope.[134] The claim must state that the invention is "to the ornamental design for the article (specifying name) as shown, or as shown and described."[135] As in the past, the rules specify the type of paper and the use of "India ink, or its equivalent that secures solid black lines, must be used for drawings."[136]

Today, at least one drawing is required.[137] Clear reproducibility remains an important concern.[138] The patent system's notice function dictates that images, which

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130 *Id.* at 790.

131 *See* Serena Camere & Elvin Karana, *Fabricating Materials from Living Organisms: An Emerging Design Practice*, 186 J. OF CLEANER PROD. 570, 573 (2018) (providing examples).

132 *Id.* at 571.

133 37 C.F.R. § 1.154.

134 Egyptian Goddess, Inc. v. Swisa, Inc., 543 F.3d 665, 679 (Fed. Cir. 2008).

135 37 C.F.R. § 1.153(a).

136 37 C.F.R. § 1.152 (requiring the use of black and white drawings as the default rule); U.S. Patent & Trademark Office, Manual of Patent Examining Procedure § 1.84(e)–(g) [hereinafter MPEP].

137 37 C.F.R. § 1.154.

138 37 C.F.R. § 1.84(l) states that patent drawings must have "satisfactory reproduction characteristics.

are integral to design patent claims, must be created with lines that "permit adequate reproduction."[139] Color is now accepted.[140] To prioritize reproducibility, the rules state that black-and-white drawings are "normally required."[141] Such images must be created with lines that "permit adequate reproduction," a circumstance that discourages the addition of rich detail.[142] Standardized symbols can be used to designate different textures or other drawing elements.[143] They are not required.[144] The agency is not empowered to require color or photographic representations.[145] The PTO counsels against submitting both drawings and photographs to appear in the issued patent.[146] No rule allows for the submission of alternative media, such as three-dimensional representations, moving images, or any representations beyond the visual.

Unlike the rules of the nineteenth century, there is no longer a prohibition on the specification of materials. However, the extensive use of text to describe the shape or materials is unusual.[147] The rules state, "[n]o description of the design in the specification beyond a brief description of the drawing is generally necessary since as a rule, the illustration in the drawing views is its own best description."[148] For example, a patentee is permitted to describe in words the aspects of the claimed design that are not illustrated in the drawing.[149] If enabling details of the product's design are included, it is unclear whether such information would be considered part of the design unless it impacts the article's surface shading.[150] The agency invites the use of such shading, for example, to show texture or three-dimensional shape.[151] It is not

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Every line, number, and letter must be durable, clean, black (except for color drawings), sufficiently dense and dark, and uniformly thick and well-defined. The weight of all lines and letters must be heavy enough to permit adequate reproduction." Similar standards govern photographs. 37 C.F.R. § 1.84(b).

139 37 C.F.R. § 1.84(l).

140 MPEP § 1.84(a)(2); *In re* Haruna, 249 F.3d 1327, 1336 (Fed. Cir. 2001).

141 37 C.F.R. § 1.84(a)(1) (stating "[b]lack and white drawings are normally required. India ink, or its equivalent that secures solid black lines, must be used for drawings.").

142 37 C.F.R. § 1.84(l).

143 37 C.F.R. § 1.84(n).

144 37 C.F.R. § 1.53(a) ("No description, other than a reference to the drawing, is ordinarily required. The claim shall be in formal terms to the ornamental design for the article (specifying name) as shown, or as shown and described.").

145 Examiners are permitted to request a line drawing in lieu of a photograph. *Id.*

146 MPEP ¶ 15.05(V) states: "[p]hotographs and drawings must not be combined in a submission of the visual disclosure of the claimed design in one application. The introduction of both photographs and drawings in a design application would result in a high probability of inconsistencies between corresponding elements on the drawings as compared with the photographs." Occasionally, patent applicants submit materials to the PTO in response to a non-final rejection that are not intended to appear in the final issued patent. For one example, see footnote 382 and accompanying text.

147 Du Mont & Janis, *supra* note 73, at 1634.

148 MPEP § 1.59 II.

149 *Id.* at II(A)(1).

150 Concept Innovation v. CFM Corp., No. 04 C 3345, 2004 WL 2812109, at *4 (N.D. Ill. Dec. 7, 2004) (a design's material is only relevant to the scope of a design patent when it impacts the visual surface of the design).

151 37 C.F.R. § 1.84(m).

required.[152]

One must be careful when including visual details. The agency's capability to reproduce either gray tones or color has limitations.[153] As one source describes, the technology underlying the online file history system distorts them, and "any color or grayscale drawing will get blurred, often to the point of unrecognizability."[154] Older issued design patents had significant legibility issues.[155] For these, legible versions are publicly available if the PTO stored the patentee's original, cleaner images under the Supplemental Complex Repository for Examiners (or "SCORE") file, several clicks deep on a file on the PTO's website.[156]

The agency's rules state that photographs "are not ordinarily permitted" and are allowed "if photographs are the only practicable medium for illustrating the claimed invention."[157] One of the listed exceptions allows the use of photographic representation for the "ornamental effects" in a design patent.[158] For more recently issued patents, the cleanest photographs reside in an associated SCORE file.[159] A degraded version is displayed when the patent is accessed through the agency's patent search function.[160] As one example, an Apple design patent (the "'582 patent") for a watchband, below, discloses a photograph on the left obtained through the agency's search function. The clearer version, from the agency's SCORE file, is on the right:

Thus, although the agency has the technology to provide the cleanest possible

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152 *In re* Maatita, 900 F.3d 1369, 1375 (Fed. Cir. 2018).

153 Carl Oppedahl, *How to Get a Decent PDF of a US Design Patent That Is in Color or Grayscale*, ANT LIKE PERSISTENCE BLOG (11/9/2019) at https://blog.oppedahl.com/?p=5007.

154 *Id.*

155 *Id.*; Panasonic Corp. v. Getac Tech. Corp., Order re Claim Construction, at 3, Case No.: 8:19-cv-01118-DOC (DFMx) (8/3/20) (describing the agency's image degradation issues).

156 *Id.* at 6 (using the SCORE version of the design for claim construction).

157 37 C.F.R. § 1.84(b).

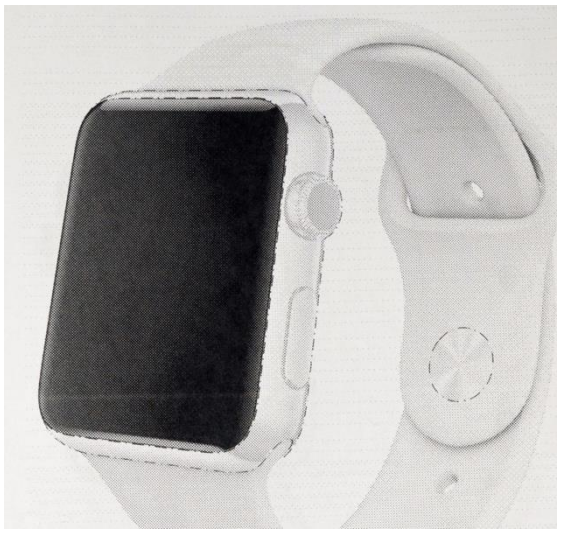
158 *Id.*

159 U.S. Patent & Trademark Office, United States Patent and Trademark Office to Deposit Certified Copies of U.S. Design Applications as Priority Documents via the WIPO DAS (World Intellectual Property Organization Digital Access Service), 1455 OG 349 (10/30/2018).

160 U.S. Design Patent No. D940,582 (filed 7/9/21).

image in the SCORE file, such an image is not provided to the public consistently. This is curious, given the importance of images to the design right.

The printed version of the '582 patent uncovered more complications. This author obtained two certified paper copies of this patent. The certified paper copy is riddled with half-tone dots that interfere with the design's representation of texture, line, and edge:



Further, the '582 patent includes the following language:

> The file of this patent contains at least one drawing/photograph executed in color. Copies of this patent with color drawing(s)/photograph(s) will be provided by the Office upon request and payment of the necessary fee.[161]

This statement was added by the applicant during prosecution.[162] Despite two attempts and some communication with the agency, this author was not successful in obtaining a printed patent with a color image for the '582 patent from the PTO or the associated SCORE file.[163] That makes pinning down the scope of this design—whether color is part of the claimed design or not—difficult.

One interesting feature of the '582 patent is the use of broken lines to isolate portions of the claimed design, including those around the watch face and case.[164] The patentee used these to disclaim areas within the dashed portions, thus limiting protection to the band alone.[165] Under design law, these lines are understood to

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[161] U.S. Design Patent No. D940,582 p. 2.

[162] Preliminary Amendment under 37 C.F.R. § 1.115, at 2 (7/9/2021).

[163] The ordering process for certified copies does not provide an option for seeking color versions specifically. A call and email with the USPTO's Certified Copy Center did not resolve the issue.

[164] *Id.* at p. 2.

[165] *Id.* ("The dot-dash lines in the figures and the areas within the dot-dash lines show portions of the wearable device that form no part of the claimed design.").

exclude such portions from legal protection.[166] Although in theory, this could lend precision to the claim's definition, these lines make the claim broader.[167] This is because, under the standard interpretation of design images, broken lines tend to exclude the territory within them from the claimed design.

Beyond this, the agency's default rules have established a visual grammar for images in design patents. High-contrast images that are uncluttered, clear, and simplified are the norm. Such rules were undoubtedly well-intentioned because, when lithography was new, these rules ensured the clearest possible reproduction at an affordable price. Perhaps unintentionally, they discourage the disclosure of rich, informative, detailed drawings and textual descriptions. In the absence of specific information in the patent, claims were deemed to apply broadly to any implementation which used the same form or structure regardless of color, texture, or materials used in their creation.[168] Although phrased in terms of a procedural rule, these proscriptions had the impact of limiting the available subject matter scope of design patents. In other words, if something cannot be represented in a drawing or an appropriate still photograph, then it cannot be protected at all. This gives the patent system a blinkered view of design. In a sense, it allows protection for designs that fit within a nineteenth-century concept of design and excludes more cutting-edge implementations that rest on more holistic forms of aesthetic user experiences.

Compared to utility patents, the lack of information demanded of design patentees is striking. The design right is not required to be supported by a robust disclosure. Broadly, such patents protect the visually appealing portions of functional goods.[169] This separation is critical—the statutory subject matter covers the aesthetic, not the functional.[170] For ex-post infringement analyses, the court's ability to separate the two rationally and cohesively is justifiably subject to question.[171] A useful starting

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166 *In re* Owens, 710 F.3d 1362, 1367 (Fed. Cir. 2013).

167 Fromer & McKenna, *supra* note 15, at 139 ("depicting some aspects of the article in broken lines makes the claim broader rather than narrower").

168 *In re* Hall, 69 F.2d. 660, (C.C.P.A. 1934); *Ex parte* Weinberg, 1871 Dec. Comm'r Pat. 244; *Ex parte* Niedringhaus, 1875 Dec. Comm'r Pat. 22.

169 Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 148 (1989)(stating, "[t]o qualify for protection, a design must present an aesthetically pleasing appearance that is not dictated by function alone, and must satisfy the other criteria of patentability"); Ethicon Endo-Surgery, Inc. v. Covidien, Inc., 796 F.3d 1312, 1328 (Fed. Cir. 2015)("Articles of manufacture necessarily serve a utilitarian purpose, but design patents are directed to ornamental designs of such articles.").

170 35 U.S.C. § 171(a). The most coherent opinions include Richardson v. Stanley Works, 597 F.3d 1288, 1293-94 (Fed. Cir. 2010); Ethicon Endo-Surgery, Inc. v. Covidien, Inc., 796 F.3d 1312, 1315 (Fed. Cir. 2015) (performing infringement analysis, excluding functional aspects of the design from the comparison); Richardson v. Stanley Works, Lee v. Dayton-Hudson Corp., 838 F.2d 1186, 1190 (Fed. Cir. 1988) (for design patent infringement, "such designs must be equivalent in their ornamental, not functional, aspects").

171 McKenna, *supra* note 14, at 198 ("When the Federal Circuit reduces ornamentality to nonfunctionality, it distorts the issue in design patent by taking ornamentality out of the equation."); Menell & Corren, *supra* note 15, at 31 (arguing that "courts lost the compass that Congress provided and set upon a treacherous course that undermined the coherence of the intellectual property system.").

point would require applicants to affirmatively define the ornamental aspects of their design in their application. Unquestionably, the one who is in the best position to identify the ornamentality of any claimed design is the designer. Decision-makers would not be bound by this assertion, just as they can assess the prima facie assertion of the patentability requirements for utility patents.

On its face, the patent statute requires adequate disclosure for design patents.[172] Yet as one study finds, "statistically it is easy to get and keep a design patent" because the standards applied are easy to satisfy in practice.[173] All patentability requirements should be meaningfully enforced, including in the aesthetic realm. For example, technical information learned to solve aesthetic problems should be disclosed under the enablement standard. More innovative design commonly generates new materials, new product techniques, and manufacturing methods.[174] The design field would benefit. The applicant's disclosure of the aesthetic problem to be solved enriches the application of the nonobviousness requirement in the design patent space.[175] Currently, courts are required to make nuanced judgments based solely on spare disclosures based on simplified, non-informative drawings. Unlike trademark and copyright law, the design patent system is ideal for distributing such innovations. Given that design patents can create valuable rights, it is appropriate to hold applicants firmly to the statutory requirements.

The nineteenth century's emphasis on added embellishments fit reasonably well with the agency's preferred mode of representation using two-dimensional, static images. As will be seen with the examples provided in Parts V(b) and VI, more recent creative design practices are much harder to capture in this modality. Certainly, these forms of representation render it impossible to consider multisensory design. Yet the patent system is an ideal form of protection for such features because it offers the opportunity to describe the invention under the statutory definiteness requirement. Relying primarily on a very simple image makes a rational, critical separation very difficult to do, particularly without sufficient information explained by the patent design applicant.

III. Ornamental: Relic of the Past

A U.S. design patent requires that the subject matter constitute a "new, original and ornamental design for an article of manufacture."[176] The recent decades have led the courts away from affirmatively defining one key word in this phrase—that is,

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[172] 35 U.S.C. § 171(b).

[173] Sarah Burstein, Sarah & Saurabh Vishnubhakat, *The Truth About Design Patents*, 71 AM. U. L. REV. __ (forthcoming 2022), https://ssrn.com/abstract=4001099.

[174] For some examples, see Bill Stumpf, *Observations and Intentions*, 126 DESIGN Q. 27, 35 (1984); and LEANDER KAHNEY, JONY IVE: THE GENIUS BEHIND APPLE'S GREATEST PRODUCTS 246–247 (2014) (manufacturing and tooling techniques).

[175] 35 U.S.C. § 103; Titan Tire Corp. v. Case New Holland, Inc., 566 F.3d 1372, 1380 (Fed. Cir. 2009) ("Design patents are subject to the nonobviousness requirement of 35 U.S.C. § 103.").

[176] 35 U.S.C. § 171.

ornamental. Instead, the analysis allows protection for all design patents with non-functional subject matter.[177] The underlying assumption rests on an unstated presumption that everything about a design patent drawing is ornamental except for the functional portions. This has left the law with an absence of a working vocabulary that can be used to identify and isolate the creative aspects of a design patent claim. This lack of vocabulary has left the system without a foundation for considering the harder questions of policy that should be present in patentable subject matter and nonobviousness decisions.

Examining history shows a disconnect between these legal rules and the massive shift in design thinking that has occurred over the past century. By examining what design *was*, compared to what design currently *is*, the system can begin to form a stronger foundation to accomplish its purpose in the current era.

A. Early Legislative Understandings

The word ornamental was added to the Design Patent statute in 1902. The legislative history of this change was very short and the record is very brief.[178] The motivation for the amendment centered on conflicting interpretations of the word "useful" in the former statute.[179] In the process, then-Commissioner of Patents Allen proposed to change the statutory language that delineated design patent's available subject matter to eliminate the word "useful" and substitute the words "any new, original, and artistic design" instead.[180] The Senate Committee on Patents changed the word "artistic" to "any new, original, and *ornamental* design" without explanation.[181]

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[177] Menell & Corren, *supra* note 15, at 172.

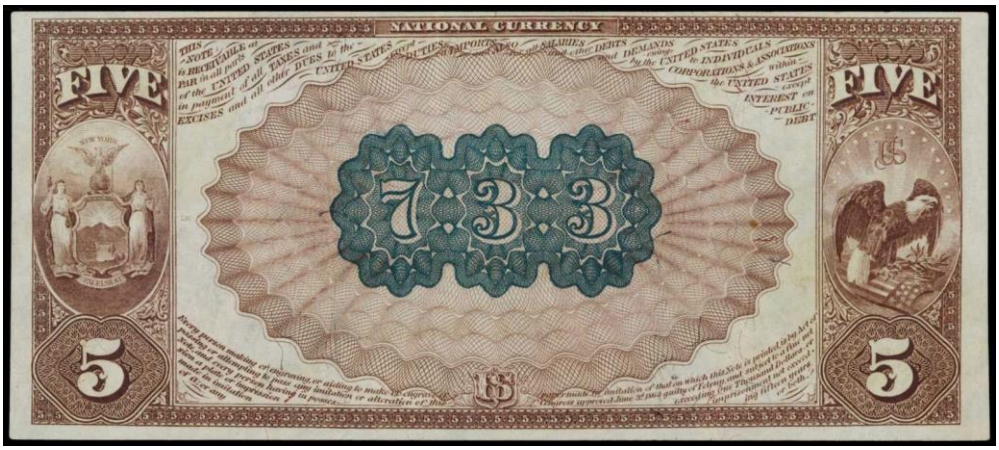
[178] Harold Binney, *Present Status of the Law Relating to Designs*, 10 AM. LAW. 396, 396–98 (1902) (observing that the amendment passed "without the approval of the profession" and that "the entire history of the bill covers a period of only a little more than one month.").

[179] S. REP. NO. 1139, 57th Cong., 1st Sess. 2–3 (Apr. 15, 1902); Menell & Corren, *supra* note 15, at 127.

[180] S. REP. NO. 1139, 57th Cong., 1st Sess. 1–3 (Apr. 15, 1902) (quoting Patent Commissioner F. I. Allen).

[181] *Id.* at 1; *see also* SENATE CALENDAR NO. 1147 S.4647, 57th Cong., 1st Sess. 1 (Apr. 15, 1902) (reflecting the word change).

By this time, Congress had used the term "ornamental" in other contexts. The word was in the first version of the design patent statute.[182] It had been used in Supreme Court opinions.[183] Additionally, the word is scattered throughout Congressional documents, such as the description of elaborate details engraved on currency to discourage counterfeiting.[184] One example of a design that was considered ornamental is a series of charter numbers "733" surrounded by an elaborate linear pattern on the back of an 1882 bill.[185]



Separately, a joint resolution approved the installation of an "ornamental drinking-fountain" in Washington, D.C.[186] A public law authorized the distribution of specified military guns and cannons to various U.S. cities "for ornamental purposes" to decorate public spaces.[187] These legislative uses are consistent with case law, which considered design patents to apply to ornamental objects and so "encourage works of art and decoration which appeal to the eye, to the aesthetic emotions, to the beautiful."[188]

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182 Act of Aug. 29, 1842, ch. 263, § 3, 5 Stat. 543, 543–44 (1842) (authorizing protection for "any new and original impression or ornament to be placed on any article of manufacture").

183 *See, e.g.*, Gorham Mfg. Co. v. White, 81 U.S. 511, 525 (1871) (recognizing that design patent law protects appearance, which "may be the result of peculiarity of configuration, or of ornament alone, or of both conjointly."); Smith v. Whitman Saddle Co., 148 U.S. 674, 678 (1893)(design patents); and U.S. v. Perry, 146 U.S. 71, 75 (1892) (construing the term "ornamental" for determining tariff levels for certain types of goods).

184 19 Cong. Rec. 5343, 5368 (1888).

185 *Id.* at 5368.

186 H.R.J. Res. 41, 47th Cong. (1882) (accepting the offer of Doctor H. D. Cogswell of San Francisco, California for an ornamental drinking fountain).

187 Chapter 319, 60th Cong., 35 Stat. 1069 (1909).

188 Rowe v. Blodgett & Clapp Co., 112 F. 61, 61 (2d Cir. 1901). The Rowe decision was relied upon by then-Commissioner of Patents Allen in his communication with the Senate Committee on Patents, which is incorporated into the legislative history. S. REP. NO. 1139, 57th Cong., 1st Sess. 3 (Apr. 15, 1902).

B. Defining Design: the Early Foundations

At the turn of the twentieth century, design protection was conceived as occupying the intellectual property space between utility patents and copyright.[189] As one Patent Commissioner described in 1902, such protection was intended to:

> . . .occupy its proper philosophical position in the field of intellectual production, having upon one side of it the statute providing protection to mechanical constructions possessing utility of mechanical function, and upon the other side the copyright law, whereby objects of art are protected.[190]

Unsurprisingly, these definitions are consistent with the then-prevalent American understanding of ornamentation. At that time, the term "ornament" became synonymous with the embellishment of goods that were already technologically developed.[191] As one author describes, "[t]he purpose of design is to superadd to the utility of industrial productions such artistic decoration as, without destroying their usefulness, will render them more pleasing to that mental faculty."[192] Both temporally and thematically "[t]he ornamental comes after the useful."[193] In other words, design made already-engineered products more aesthetically pleasing by adding decoration or modifying the product's shape.[194]

The primary emphasis on design during this era "was often based around the picturesque," based on visual trends that included neoclassic, neogothic, and items imported from other areas of the world.[195] According to a 1902 statement by former Patent Commissioner Allen, design patent subject matter was directed to objects that possessed "the pleasing effects imparted to the eye."[196] Rather than striking out with original designs, early Americans were strongly influenced by European trends.[197]

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189 S. REP. NO. 1139, 57th Cong., 1st Sess. 1–3 (Apr. 15, 1902) (quoting Patent Commissioner F. I. Allen).

190 *Id.* at 3.

191 LEWIS FORMAN-DAY, EVERY DAY ART: SHORT ESSAYS ON THE ARTS NOT FINE 1 (1882) (contrasting ornament and the fine arts, stating "[o]rnament is the art of every-day.").

192 W. COOK-TAYLOR, REPORT OF A SPECIAL COMMITTEE OF THE GOVERNMENT SCHOOL OF DESIGN 138 (1847).

193 FORMAN-DAY, *supra* note192, at 71 (stating that, with respect to design freedom, "[t]he tyranny of the main purpose is absolute.").

194 *Id.* at 74 (stating, "In most cases, a little consideration will show that some of the objectionable features may be omitted or supplemented by others more presentable or supplanted by others more presentable, and that the ill-effect of some may be counteracted by decorative features that in now interfere with the use, or even the character of the object.").

195 CLIVE EDWARDS, NINETEENTH CENTURY DESIGN VOL. I 8 (Clive Edwards ed., 2021); WALTER SMITH, HOUSEHOLD TASTE 7 (1880) (discussing the line between ornamentation and function explaining "the happy mean between the two, which combines the utility that serves the body with the beauty that satisfies the mind, constitutes true art.").

196 S. REP. NO. 1139, 57th Cong., 1st Sess. 3 (Apr. 15, 1902) (statement of Commissioner F.I. Allen quoting Rowe v. Blodgett, 112 Fed. Rep. 61 (2d Cir. 1901)).

197 David Jaffee, *Post-Revolutionary America: 1800–1840, in* HEILBRUNN TIMELINE OF ART HISTORY (2000); Catherine Lynn, *Decorating Surfaces: Aesthetic Delight, Theoretical Dilemma, in* THE METROPOLITAN MUSEUM OF ART, IN PURSUIT OF BEAUTY 62 (Doreen Bolger Burke et al., eds., 1986)

Some of this activity was facilitated by immigrants, who were already trained in the techniques needed to create these objects.[198] A combination of these factors led to much design in the 19th century to celebrate the past.

Design activity was conceptualized as closely connected to the finished item, with a particular aim to create a specific, fully-conceived manufactured product.[199] Design law has adopted this concept by tying the subject matter of design patents to an "article of manufacture"—that is, a specific type of product.[200] In contrast, for utility patents, the invention is a conceptual exercise and therefore more distant from any specific commercial endpoint.[201] This interactivity of these ideas is visible in the evolution of the Singer sewing machine. Engineering its functionality was the first step.[202] In August 1851, Singer was issued a utility patent.[203] A figure from that patent is included below.[204] The first commercially available Singer sewing machine, introduced that same year, is a boxy, utilitarian shape with simple linear gold-colored decals.[205] This comparison shows that the first version echoes, to a large degree, the functional shape claimed in the utility patent.

("English inspiration for American opinions about surface ornament during the Aesthetic era was inescapable.")

198 KRILL, *supra* note 21 , at 93 (discussing immigrant expertise influencing early American design).

199 EDWARDS, *supra* note 195, at 3 (stating, "[o]f these four elements relating to the progress of mechanics, invention, and design are most intimately associated with each other. Discovery is more closely connected with invention that with design; skill is more closely associated with design than invention." (quoting C.L. Redfield, *The Relation between Invention and Design to Mechanical Progress*, 12 FACTORY AND INDUS. MGMT. 286 (1896-9))).

200 Curver Luxembourg, SARL v. Home Expressions Inc., 938 F.3d 1334, 1341 (Fed. Cir. 2019).

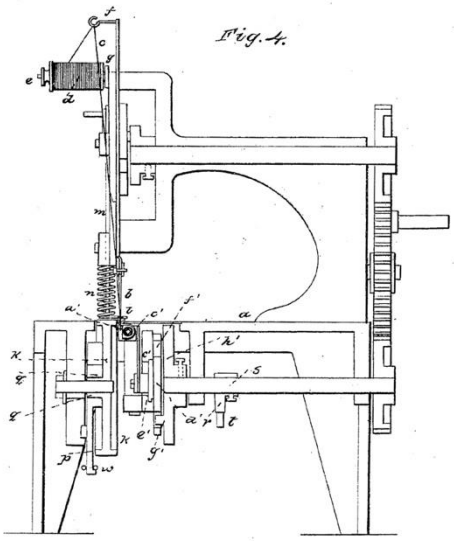
201 *Id.* (explaining, "Discovery is more closely connected with invention than with design; skill is more closely associated with design than with invention."); Timothy R. Holbrook, *The Importance of Communication to Possession in IP*, 100 B.U. L. REV. ONLINE 16, 17 (2020) (For utility patents, "the invention is the idea and not a particular physical embodiment.").

202 *See Singer's Sewing Machine*, 7 SCI. AM. 49 (Nov. 1, 1851) (describing its operation); U.S. Patent No. 8,294.

203 U.S. Patent No. 8,294.

204 *Id.* at Fig. 4.

205 GRACE ROGERS COOPER, THE INVENTION OF THE SEWING MACHINE 31 (1968).



This sewing machine was originally designed for clothing manufacturers—rather than home use—and was shipped in a wooden packing crate that was used as its stand.[206] As the company expanded, it sought to modify the design as the machine

[206] American Museum of Natural History, *1851 - Isaac Singer's Sewing Machine Patent Model*, SMITHSONIAN, https://americanhistory.si.edu/collections/search/object/nmah_1071133 (last accessed Mar. 29, 2022); PENNY SPARKE, AN INTRODUCTION TO DESIGN CULTURE: 1900 TO THE PRESENT 69 (3d ed. 2013) (showing a picture of the crate).

"had to be naturalized and domesticated for the parlour."[207] Singer began to introduce machines with more elaborate designs, including one version with an ironwork stand in the shape of climbing ivy (pictured below) and other versions set in wood cabinets carved to resemble fine furniture.[208] According to a Singer brochure from the 1850s, such designs represented "a lighter and more elegant form; a machine decorated in the best style of art so as to make a beautiful ornament in the parlor or boudoir."[209] This example shows how the practice of ornamentation was "put[ting] a beautiful wrapper around the idea" of Singer's utility patent-protected sewing machine.[210]

In this era, such embellishment rendered a utilitarian object more acceptable for home use by "bestowing upon it an amount of beauty that it would not otherwise possess."[211] The first industrial designer, Christopher Dresser, described the

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[207] MEIKLE, *supra* note 20, at 45.

[208] *Id.*; COOPER, *supra* note 205, at 34.

[209] *Id.* at 32.

[210] Brown, *supra* note 1, at 86. Curiously, some machines never underwent a similar transition. For example, the bicycle's design appears to have remained free of any elaborate embellishment. SIGRIED GIEDION, MECHANIZATION TAKES COMMAND: A CONTRIBUTION TO ANONYMOUS HISTORY 57 (1970).

[211] CHRISTOPHER DRESSER, THE ART OF DECORATIVE DESIGN 1 (1862).

appropriate process as one that began with a product's function and ended with decoration.[212] In those days, it was not uncommon for design to be somewhat visually separable from the product's function. As architectural critic Antoine Picon describes, traditional ornamentation was added to a building's structure in a way that "one could imagine a building deprived of it."[213] The "superadd[ed]"[214] decoration is illustrated by the vine pattern added to support the functional sewing machine. The trend toward more complete integration of the two, which is far more common today, did not fully develop until later.

As the end of the nineteenth century approached, design thinkers began to reflect on their relation to culture. Although today, these philosophies are outdated, in the 1800's ornamentation was celebrated by its perceived contributions to the public. Owen Jones published *The Grammar of Ornament* advised that all architecture should be decorated.[215] With an "overwhelming stress on visual values,"[216] home decoration trends embraced ornamentation as "likely to dominate much of the available space in any one of the rooms."[217] Philosopher John Ruskin asserted that beautiful things encouraged morality, good taste, and good character.[218] He argued that good design was capable of teaching citizens qualities that would improve "the state of national life."[219] Some companies hired fine artists who adapted their expertise and influence to design projects.[220] Rather than centering design around the product's end-users, the field endeavored to educate consumers about the value of their designs by asserting expertise to define taste.[221]

Ornamentation was used to signal the public importance of certain buildings.[222] Theodore Veblen considered that the consumption of highly designed goods was

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[212] *Id.* at 21 ("The most useful form for the object, or most appropriate condition of the surface to the be decorated, must be first ascertained, and then the enriching may take pace by the application of forms or lines which in no way detract from utility or comfort.").

[213] ANTOINE PICON, ORNAMENT: THE POLITICS OF ARCHITECTURE AND SUBJECTIVITY 37 (2013).

[214] COOK-TAYLOR, *supra* note 192, at 138.

[215] OWEN JONES, THE GRAMMAR OF ORNAMENT 4 (1856) (Proposition No. 5).

[216] Roger B. Stein, *Artifact as Ideology: The Aesthetic Movement in Its American Cultural Context, in* THE METROPOLITAN MUSEUM OF ART, IN PURSUIT OF BEAUTY 23, 39 (1986).

[217] DOREEN BOLGER BURKE ET AL., *PREFACE* OF THE METROPOLITAN MUSEUM OF ART, IN PURSUIT OF BEAUTY 19 (1986); *see generally* CLARENCE COOK, THE HOUSE BEAUTIFUL: ESSAYS ON BEDS AND TABLES, STOOLS AND CANDLESTICKS (1878).

[218] John Ruskin, *Traffic 51 (Apr. 24, 1864), in* 2015 DIDEROT CLASSICS (2015) ("Taste is not only a part and an index of morality — it is the ONLY morality.") (emphasis in original).

[219] *Id.* Ruskin's works were widely read in the U.S. at the time. MEIKLE, *supra* note 20, at 66.

[220] ADAMSON, *supra* note 25, at 11–12.

[221] *See, e.g.*, DRESSER, *supra* note 211, at 22 ("One great work of the ornamentist is that of refining his mind in order that he may be enabled to discover and fully appreciate those delicacies of form and line which are unperceived by the untutored and careless observer: to this end the formation of an intimacy with nature will be found most conducive, as it inevitably leads to the cultivation of taste"); FORMAN-DAY, *supra* note 193, at 17.

[222] PICON, *supra* note 213, at 49 (on public buildings, ornamental "constituted an indicator of the relative importance of the institutions and people association with the construction of the building").

symbolic of a higher social class.[223] Under this view, ornateness was equated with its owner's identity.[224]

Such theories and formulated definitions of good taste fueled purchases of objects with ornamental embellishments for the home.[225] Rooms were filled with an elaborate mix of decorated items.[226] Functional items were covered with ornamentation that had an "overwhelming stress on visual values."[227] In the more fashionable homes, surface ornament that seemed "to cover everything in American rooms" such that "[p]atterns on walls, ceilings, carpets, rugs, window draperies, portieres, pillows, and upholstery are likely to dominate much of the available space in any one of the room."[228]

[223] THORSTEIN VEBLEN, THE THEORY OF THE LEISURE CLASS 36 ("Since the consumption of these more excellent goods is an evidence of wealth, it becomes honorific; and conversely, the failure to consume in due quantity and quality becomes a mark of inferiority and demerit"). *See generally* Barton Beebe, *Intellectual Property Law and the Sumptuary Code*, 123 HARV. L. REV. 809, 813–14 (2010).

[224] PICON, *supra* note 213, at 48.

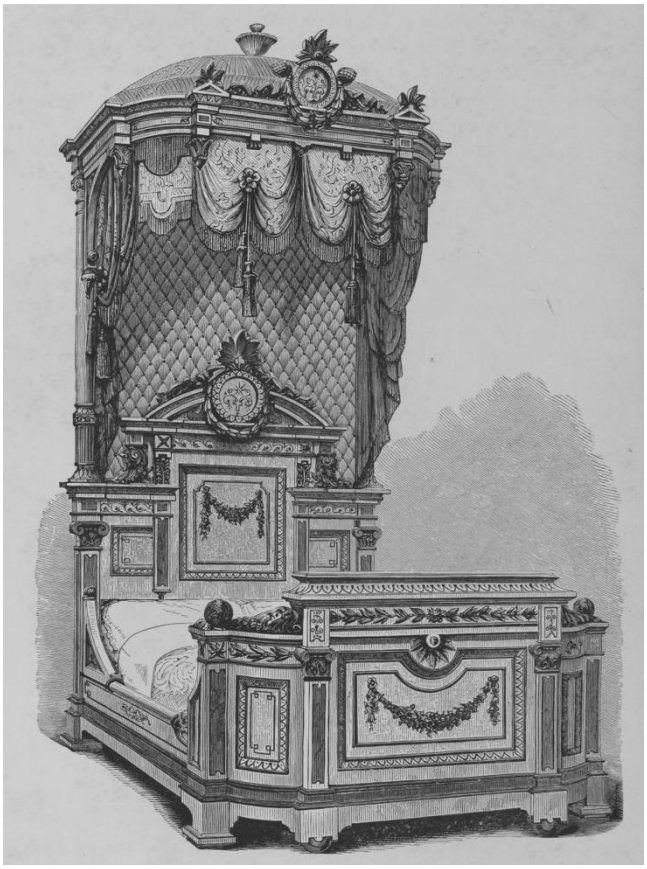
[225] Catherine Lynn, *Decorating Surfaces: Aesthetic Delight, Theoretical Dilemma, in* THE METROPOLITAN MUSEUM OF ART, IN PURSUIT OF BEAUTY 54 (Doreen Bolger Burke et al., eds., 1986).

[226] Stein, *supra* note 220 ("[T]he special challenge of the Aesthetic movement lay in the sensitive arrangement of beautiful objects within the domestic interior to arrive at an overall harmony.").

[227] *Id.*; SPARKE, *supra* note 20, at 71.

[228] Burke et al., *supra* note 217; *see also* Cook, *supra* note 217, at xxii.

In 1851, the U.S. assembled a committee to choose the best American design to send to the Great Exhibition of 1851 that took place in Britain.[229] Among other things, the committee chose an elaborately adorned fifteen-foot-high gas chandelier, pictured here.[230] This brass version was said to be "very rich in ornament" with fifteen glass globes covering gas burners controlled by keys shaped to resemble clusters of fruit.[231] The elaborate scrollwork appears inspired by tendrils, leaves, and stems, appearing to fit within Reigel's 1893 description favoring ornamentation that was "representational, symbolic vegetal motifs."[232]



Another example is this bed design from the International Exhibition of 1876,

[229] Marcus Cunliffe, *America at the Great Exhibition of 1851,* 3 AM. QUART. 115, 118 (1951).

[230] GEORGE VIRTUE, THE ART JOURNAL-ILLUSTRATED CATEGORY OF THE INDUSTRY OF ALL NATIONS 212 (1851); *see also* Meikle, *supra* note 20, at 40.

[231] *Id.*

[232] ALOIS RIEGL, PROBLEMS OF STYLE: FOUNDATIONS FOR A HISTORY OF ORNAMENT 53 (Evelyn Kain, translator, 1992).

created by an American company that mimicked the Renaissance style.[233] According to a catalog, the bed (pictured here) was "worthy of note" and its "richness and character of the ornamentation is striking."[234]

However, the social implications of design did not consistently translate into extreme embellishment. For example, the Arts and Crafts movement, which emphasized stylistic simplicity, relied on production by individual craftspersons who were assembled into guilds.[235] The movement was motivated by an ideology that rejected industrialization and thereby created works that resembled early English country styles.[236] Nonetheless, the legislative choice of the term ornamental arose at a time when the word had an important and widespread meaning.

C. The Backlash to Ornament

The design field experienced a backlash to elaborate decoration just a few years after the U.S. added the word "ornamental" to the Patent Act.[237] One work that was emblematic of this criticism is Adolf Loos' 1908 *Ornament and Crime*.[238] In a work that contributed to the transition to modernism, Loos' essay accepted that the labor required to make elaborately decorated objects were out of touch with an industrialized system and mass consumption.[239] Loos argued that ornament wasted craftsperson's efforts and that, as a social matter, "[t]he evolution of culture is synonymous with the removal of ornament from utilitarian objects."[240] Broadly stated, Loos argued

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233 WALTER SMITH, EXAMPLES OF HOUSEHOLD TASTE 25–27 (1875) (describing the bed and a drawing of it, describing the style as Renaissance).

234 *Id.* at 27.

235 Mary Ann Stankiewicz, *From the Aesthetic Movement to the Arts and Crafts Movement*, 33 STUDIES IN ART EDUC. 165, 169 (1992); Sheila Rowbotham, *Arts, Crafts & Socialism*, HISTORY TODAY 44, 45 (Feb. 2008).

236 *Id.* at 170 ("Even when its products were predeterminately rough in finish and quality of work, so that they could be reproduced by the semi-skilled amateur in her leisure time, the prices charged set them beyond reach of the average consumer."); Diana Maltz, *Living by Design: C.R. Ashbee's Guild of Handicraft and Two English Tolstoyan Communities*, 39 VICTORIAN LIT. AND CULTURE, 409 (2011).

237 Christopher Long, *The Origins and Context of Adolf Loos's "Ornament and Crime,"* 68 J. OF SOC. OF ARCHITECTURAL HISTORIANS 200, 210 (June 2009) (describing a wave of literature criticizing ornament).

238 Adolf Loos, *Ornament and Crime, in* PROGRAMS AND MANIFESTOS OF 20TH CENTURY ARCHITECTURE 19 (Ulrich Conrads, ed.,1970) (originally published in 1908). As recognized in JANET STEWART, FASHIONING VIENNA: ADOLF LOOS'S CULTURAL CRITICISM 84–87 (2000), Loos sought to persuade aristocrats to lead cultural change toward modernism to avoid a coming revolution precipitated by class struggles throughout Europe. As Stewart discusses, some portions of Loos' work include racist statements in a manner consistent with Enlightenment-era thinking. *Id.* at 69-70. *See* Daniel Carey & Sven Trakulhun, *Universalism, Diversity, and the Postcolonial Enlightenment*, *in* THE POSTCOLONIAL ENLIGHTENMENT: EIGHTEENTH-CENTURY COLONIALISM AND POSTCOLONIAL THEORY 240, 255 (Daniel Carey & Lynn Festa eds., 2009). However, the core of Loos' theory rested on improving working conditions for artisans. Long, *supra* note 237 at 211 (stating that Loos' position was that ornamentation "a contribution to the exploitation of craftspeople, who were being inadequately compensated").

239 FIELL & FIELL, *supra* note 22, at 223–24 (2016).

240 Loos, *supra* note 238, at 20; Long, *supra* note 237, at 200–01(contextualizing the importance of

that such embellishment was a wasteful enterprise, particularly because rapidly evolving trends rendered functional objects outmoded far sooner than they were functionally spent.[241] His argument pushed back against the churn of status-based obsolescence that was the subject of Veblen's work.[242] Loos argued against the type of rich, elaborate that echoed the past.[243] Loos declared, "[w]e have outgrown ornament,"[244] just at the time that other design thinkers reconsidered embellishment.[245] His work began an era of rationalism that dominated the design field throughout the following years.[246] By the 1920s, many widely-available designs used far simpler lines and forms.[247]

The Patent Act's 1902 addition of the phrase "ornamental design" to define the subject matter scope has not been revised since.[248] But ornament—as that word was used in the vernacular—has become culturally outdated.[249] Essentially, Loos' work ended the design's discomfort with industrialization by embracing it. This does not suggest that consumer products have eliminated all aesthetic qualities. In the U.S., industrial design emerged that fully integrated the product's purpose with its aesthetic.[250] Functionalism became cabined primarily within the architectural field and did not have a lasting influence on the design of everyday objects.[251] Rather than acting as a movement, minimalism has become one of several styles from which consumers can choose.[252] In other words, Loos' writing has not eliminated the significant attention given to product aesthetics.[253]

Loos' *Ornament and Crime* to modernism).

241 Loos, *supra* note 238, at 23 ("If all objects would last aesthetically as long as they do physically, the consumer could pay a price for them that would enable the worker to earn more money and work shorter hours.").

242 Long, *supra* note 237, at 211; Loos, *supra* note 238, at 23; *see supra* note 223, and accompanying text.

243 Long, *supra* note 237, at 444; *see also* Irénée Scalbert, *Ornament*, *in* CRUCIAL WORDS IN CRUCIAL WORDS: CONDITIONS FOR CONTEMPORARY ARCHITECTURE 138 (Gert Wingårdh et al., eds., 2012) (summarizing Loos' argument that "ornament had lost its organic relationship to culture").

244 Loos, *supra* note 238, at 20. For a similar view, see HORATIO GREENBOUGH, FORM AND FUNCTION: REMARKS ON ART, DESIGN, AND ARCHITECTURE 75 (1947).

245 SPARKE, *supra* note 206, at 68 (discussing the trend among other design thinkers); Andreas Vrahimis, *Wittgenstein, Loos, and the Critique of Ornament*, 58 ESTETIKA: CENT. EUR. J. OF AESTHETICS 144, 147 (2021).

246 Sparke, *supra* note 206, at 165.

247 MEIKLE, *supra* note 20, at 90.

248 35 USC § 171.

249 FIELL & FIELL, *supra* note 22, at 225; *see also* Penny Sparke, *At the Margins of Modernism: the Cut-Crystal Object in the Twentieth Century*, 77 BULLETIN OF THE JOHN RYLANDS LIBR. 31, 31–32 (1995) (discussing that modernism had "a new aesthetic agenda which rejected all the visual effects associated with its past.").

250 SPARKE, supra note 206, at 70–71.

251 *Id.* at 80–81.

252 *Id.* at 109.

253 *See generally* Paul Hekkert & Helmut Leder, *Product Aesthetics*, *in* PRODUCT EXPERIENCE 259–60 (Hendrik N. J. Schifferstein & Paul Hekkert eds., 2008).

Design became more expansive in its forms of aesthetic expressions.[254] Today, the prevalence of visual embellishment is a far too limited concept to describe design aesthetics. Indeed, there is an emerging movement to define the aesthetics of sustainability that pushes entirely against it.[255] This leaves the 1902 statute's use of the phrase "ornamental" to define the scope of design patent subject matter in a precarious place. Its definition is important. The word can be used to measure how well (or poorly) our current system of representation operates. It reveals whether there is a mismatch between the scope of design in the real world and the ways that design is capable of being represented under the current rules.

To construe the design patent protection toward a now-rejected style makes little sense. The legislative history for the 1902 amendment adding the word "ornamental" to the Act is short and uninformative.[256] The courts recognize that "design patents cover only the specific ornamental conceptions of the features shown in their figures."[257] Lines are then drawn to determine which aspects of the figures are ornamental and therefore protected.[258] Unfortunately, this process treats ornament in the subtractive sense—that is, the aspects of the design that are non-functional and therefore protected.[259] The test provides little opportunity to explore legal definitions of design. Indeed, the Federal Circuit has suggested that describing design patent figures in words may be a profitless endeavor for courts to undertake.[260] This circumstance has left a definitional vacuum.[261]

Currently, the scope of subject matter has remnants of the outdated set of rules that were established to compensate for an inadequate technological reproduction process. Laws should evolve to serve their primary statutory purpose. The legal system does not need to shift seasonally to capture fundamental shifts in the design field that have emerged over the past decades and that have sustained through the present time.

IV. The Current Era: Aesthetics, Meaning, and Experience

The law's inability to provide a working definition of design is problematic. The word ornamental evokes visual embellishment as the target, as the term was used in the past. To provide ballast to this unmoored system, some grounding in current design thinking is necessary. Formerly, fine artists who had migrated to designing useful objects were strongly influenced by their training.[262] Then, "many manufacturers

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254 *Id.* at 260 (stating "[a]esthetics is not limited to the visual domain").

255 Kristine H. Harper, Aesthetic Sustainability: Design and Sustainable Usage 77–78 (2017).

256 Harold Binney, *Present Status of the Law Relating to Design*, 10 AM. LAW. 396, 396–98 (1902) (observing that the amendment passed "without the approval of the profession" and that "the entire history of the bill covers a period of only a little more than one month.").

257 Ethicon Endo-Surgery, Inc. v. Covidien, Inc., 796 F.3d 1312, 1332 (Fed. Cir. 2015).

258 *Id.;* Auto. Body Parts Ass'n v. Ford Glob. Techs., LLC, 930 F.3d 1314, 1319 (Fed. Cir. 2019).

259 OddzOn Prod., Inc. v. Just Toys, Inc., 122 F.3d 1396, 1405 (Fed. Cir. 1997).

260 Egyptian Goddess, Inc. v. Swisa, Inc., 543 F.3d 665, 679 (Fed. Cir. 2008).

261 McKenna, *supra* note 14.

262 Doreen Bolger Burke, *Painters and Sculptors in a Decorative Age* in THE METROPOLITAN MUSEUM

saw designs as the decoration of an object, rather than as an integral part of its conception, planning, and realization."[263] Many of these endeavors were unsuccessful, given that artists lacked the expertise to translate their aesthetics to the creation of everyday objects.[264]

This Part offers an overview of the shift toward aesthetic problem-solving. As Loos' work foretold, since at least the middle of the twentieth century, elaborate visual embellishment has faded as an important design trend. In its place, newer forms of design aesthetics have emerged.[265] Rather than making existing functional products more attractive to consumers, the field broadened to include human-centered design, which first considers people's needs, capabilities, and wants before the design process begins.[266] The most innovative design uncovers needs that have never been articulated.[267] Of course, such products have functional properties—for example, a chair may have a back that supports the user, or is lightweight such that it can be carried. Yet well-designed products also solve aesthetic problems. For example, a chair may have communicative properties that convey concepts like playfulness, luxury, or comfort.[268] Its form may communicate collapsibility for easy transport, or its color suggests formality or cheerfulness. In other words, a designer can use semiotics to solve previously-underappreciated ways that devices communicate with people.[269] Additionally, appearance can be aimed toward eliciting an emotional response.[270] Other design features teach, using their form or features to suggest ways that the user might interact with the product.[271] The best designs are embedded with communicative codes, drawn from cultural references that are readily (and perhaps unconsciously) understood by users.[272] Other designs connect with a consumer's self-image, memories, aspirations, or sense of belonging.[273]

As one source describes, designed products can embody a language, including "forms of expression such as dimension, form, structure of the physical surface, movement, quality of material, means of fulfilling function, colors, and the graphic design of the surface, sounds and tones, taste, smell, temperature, packaging, and

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OF ART, IN PURSUIT OF BEAUTY 295–96 (Doreen Bolger Burke et al., eds., 1986); ADAMSON, *supra* note 21, at 11–12.

263 FIELL & FIELL, *supra* note 22, at 113.

264 *Id.* at 12–13.

265 Brown, *supra* note 1, at 86 (describing design as innovation "powered by a thorough understanding, through direct observation, of what people want and need in their lives and what they like or dislike about the way particular products are made, packaged, marketed, sold, and supported.").

266 NORMAN, *supra* note 12, at 9 (describing human-centered design).

267 DON NORMAN, EMOTIONAL DESIGN: WHY WE LOVE (OR HATE) EVERYDAY THINGS 74 (2004).

268 NORMAN, *supra* note 12, at 13–14 (describing design signifiers).

269 BERNHARD E. BÜRDEK, DESIGN: HISTORY, THEORY AND PRACTICE OF PRODUCT DESIGN 91 (2d ed. 2015).

270 NORMAN, *supra* note 267, at 64 (describing the visceral reaction to a bottle).

271 *Id.* at 71.

272 BÜRDEK, *supra* note 269, at 90–91.

273 *Id.* at 172–173.

resistance to external influences."[274] This process requires defining the problems to be solved, generating alternative ideas, and iterating potential solutions.[275] As the following example demonstrates, design has evolved far past an era that relied on mere decoration as the primary creative vehicle.

A. Example: the Equa Chair

By the twentieth century, design institutions had been established to focus on teaching design as a differentiated field.[276] Some, including the Bauhaus and Ulm School, began to develop theories that were specific to design, both of which proved to be influential.[277] Some of the influential theories of these institutions included the concept that designed objects had their own communicative grammar that was, over time, open to change.[278] The Ulm School's design curricula included teaching sensory experiences.[279] As one source describes, "the school viewed aesthetics as a non-subjective 'language' in which form is an element of a design operation, a calculable phenomenon."[280]

Over time, the field was influenced by such diverse disciplines as systems theory and the humanities.[281] Rather than embellishing products that were already engineered, design thinking emerged to solve real-world problems that account for the user's experience.[282] Design thinking became a vehicle for creating objects to solve problems according to a set of criteria and not merely making functional products more attractive.[283] As Charles Eames described, designing is a "plan for arranging elements in such a way as to best accomplish a particular purpose."[284] In many cases,

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274 *Id.* at 139 (quoting THEODOR ELLINGER, OPERATIONS RESEARCH: EINE EINF HRUNG (1966)).

275 *See generally,* Nathalie Bonnardel & Carol Bouchard, *Creativity in Design* in the J. KAUFMAN, V. GLĂVEANU, & J. BAER (EDS.), CAMBRIDGE HANDBOOK OF CREATIVITY ACROSS DOMAINS, 403 (2017); M. Reimann, & O. Schilke, *Product Differentiation by Aesthetic and Creative Design: A Psychological and Neural Framework of Design Thinking in* H. PLATTNER ET AL. (EDS), DESIGN THINKING, 45, 52–53 (2011).

276 BÜRDEK, supra note 269, at 77–80.

277 Pascal Le Masson, Armand Hatchuel & Benoit Weill, *Design Theories, Creativity and Innovation,* in ELGAR COMPANION TO INNOVATION AND KNOWLEDGE CREATION 275, 291 (Harald Bathelt et al. eds., 2017); BÜRDEK, *supra* note 269, at 37–38.

278 Le Masson, *supra* note 277, at 293; Matthew Holt, *Baudrillard and the Bauhaus: The Political Economy of Design*, 32 DESIGN ISSUES 55, 62 (2016) ("Under the aegis of the Bauhaus, design has shifted from the industrial model of styling or applied art to the more amorphous sphere of signification, communication, and participation.").

279 BÜRDEK, *supra* note 269, at 47; CORNELIE LEOPOLD, PRECISE EXPERIMENTS: RELATIONS BETWEEN MATHEMATICS, PHILOSOPHY AND DESIGN AT ULM SCHOOL OF DESIGN 365 (2012); Holt, *supra* note 278, at 141.

280 *Id.*

281 BÜRDEK, *supra* note 269, at 79.

282 Buchanan, *supra* note 9, at 9 (stating "[t]he beginning of such an understanding has already turned the study of the traditional arts and sciences toward a new engagement with the problems of everyday experience, evident in the development of diverse new products which incorporate knowledge from many fields of specialized inquiry.").

283 *Id.* at 18.

284 JOHN NEUHART & MARILYN NEUHART, EAMES DESIGN 14 (1989) (interview with Charles Eames).

designers conceived the object's creation and were integrated into the process until completion.[285]

One example is the work of two designers, Donald Chadwick and William Stumpf, who designed the Equa chair for the company Herman Miller.[286] Part of their goal was social, as they sought to create an affordable chair that promised "seating equity."[287] That is, these designers wished to design a chair to solve the "anomaly found in many office settings, where those whose jobs require them to do the most sitting are given the worst chairs."[288] Their product was intended to be imbued with playfulness and empathy with the human body, which is frequently in motion even while sitting.[289] Some of the problems that they addressed were functional—that is, they wanted the chair to be supportive yet flex in response to the user's movements.[290] Yet they wished to accomplish this design with aesthetic elegance and create an object with a delicate, flowerlike shell-shaped from a single piece of material.[291] Unlike designers of the past century, who became involved after the engineering was complete, Equa's designers conceived of the initial design, selected the materials and oversaw the engineering over the years until the chair was finalized.[292]

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285 Buchanan, *supra* note 9, at 18.

286 William Houseman, *The Making of A Serious Chair*, 126 DESIGN Q. 10, 12 (1984).

287 *Id.*

288 *Id.*

289 Stumpf, *supra* note 174, at 36.

290 *Id.*; David Lasker, *Around Home: Notes on Gazebos, Sconces and Teakettles Equa Chairs*, L.A. TIMES (June 19, 1988) ("The remarkably adaptable self-adjusting shell seems to possess a liquid, alive quality-like a water bed but firmer."), https://www.proquest.com/docview/292829888/fulltext/2D0B031B8AF42C6PQ/1?accountid=10559.

291 Houseman, *supra* note 286, at 13, 19.

292 *Id.* at 19 ("The only person in the Herman Miller product development process who is never for one minute divorced from the product is the designer himself.").

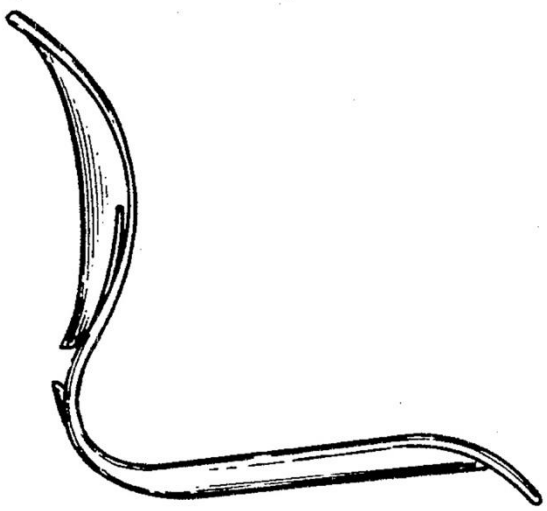

FIG. 2

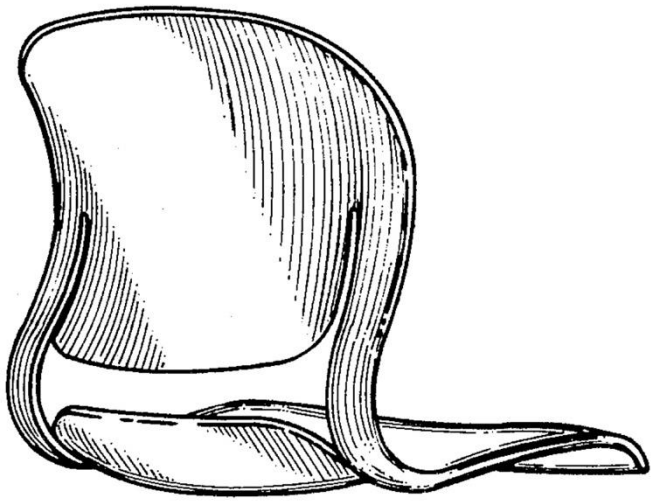

FIG. 4

The designer's early conceptions were formed around end-user needs.[293] The Equa designers looked at time-lapse X-ray, film, and video studies of seated workers throughout their day.[294] Ultimately, it was named one of the best designs of the decade.[295] The final result was a surprising aesthetic experience, given that the end-users perception of a comfortable chair required cushioning.[296] Two images from the chair's design patent are pictured here.[297] The design is not ornamental in the nineteenth-century sense—that is, it is not elaborately embellished. Instead, the curved surfaces were made of different thicknesses to give the shape an organic feeling. This appearance presented one of the most difficult technical problems that the designers solved.[298]

The material used to form the shell was integral to its visual and tactile characteristics.[299] In particular, the shell's shape was formed using a Dupont resin that allowed supportive flexibility that is responsive to movement.[300] This material allowed for the shell to be shaped into a single, smooth shape with an unbroken surface. There are no seams, connectors, or fasteners to interfere with the shell's gradual curves that eliminated straight edges. The choice of material and its manipulation allowed the creation of this graceful, responsive shape—in patent parlance, they enabled these design solutions. [301] The Equa chair's design illustrates one of several current design approaches. Rather than superadding embellishment to an already-designed object as had been done in the nineteenth century, designers Chadwick and Stumpf engaged in problem-solving that had both aesthetic and functional dimensions. In the process, they worked with technical specialists, including toolmakers and a materials specialist, to accomplish their goals.[302]

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293 NORMAN, *supra* note 267, at 71.

294 Lasker, *supra* note 290.

295 *Best of the Decade: Design,* TIME (Jan. 1, 1990), http://content.time.com/time/subscriber/article/0,33009,969072,00.html.

296 Lasker, *supra* note 290.

297 U.S. Design Patent No. D289,120 (filed Feb. 17, 1984).

298 Houseman, *supra* note 286, at 23. One designer described that a materials supplier told him that "[t]hat shell is a clinic in what you should *not* do, from a processing standpoint.".

299 The accompanying image is from Stumpf, *supra* note 174, at 40.

300 Houseman, *supra* note 286, at 21.

301 Stumpf, *supra* note 174, at 42 (describing the importance of tactility to design).

302 Houseman, *supra* note 286, at 21.

The Equa chair demonstrates the difficulty of separating the functional from the aesthetic in this current era. Its aesthetics are subtle, integrated, and multisensory. After modernism took hold, the most creative design trended to integrate the aesthetic more fully with the functional. It is perhaps unsurprising that the law should have developed a legal test that relieved courts from being required to affirmatively separate the aesthetics, given the difficulty of doing so based on the spare information in design patents. The reasons that the system does not ask the patentee to do so are less

explicable. Regardless, this trend has had costs. The default presumption is that the entire claim is protectable unless it is proven to be functional.[303] Because the legal test focuses on subtracting the utility and protecting the rest, there has not been space to develop appropriate legal conceptions of aesthetics. This creates difficulties in the manner that all other patentability requirements are analyzed, including the potential scope of protectable design.

B. Aesthetic Problems and Aesthetic Solutions

As creative designers do, the Equa chair's designers confronted and solved a number of aesthetic problems.[304] As background, challenging design environments exist where such problems are ill-defined, open-ended and where the relevant constraints lack structure.[305] Generally, these challenges require grappling with uncertainty and confronting a lack of ready solutions.[306] Some explore multiple options in parallel and integrate trial-and-error approaches similar to those used in the sciences and engineering fields.[307] For the design field, the relevant problems to be solved include aesthetics.

As with inventions protected by utility patents, designers work within constraints.[308] Many projects integrate early consumer input, and then additional input as the development process is moved forward.[309] This process is based on the understanding that users experience emotions—both positive and negative—in response to product features.[310] The emphasis on creating user experiences is illustrated by this statement by the Apple iPhone's designers who aimed to address "how you feel about the product, not in a physical sense, but a perceptual sense."[311] On this basis,

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303 Ethicon Endo-Surgery, Inc. v. Covidien, Inc., 796 F.3d 1312, 1330 (Fed. Cir. 2015); Sport Dimension, Inc. v. Coleman Co., 820 F.3d 1316, 1320 (Fed. Cir. 2016); High Point Design LLC v. Buyers Direct, Inc., 730 F.3d 1301, 1316 (Fed. Cir. 2013).

304 Ji Han, Hannah Forbes & Dirk Schaefer, *An Exploration of How Creativity, Functionality, and Aesthetics Are Related in Design*, 32 RES. IN ENG. DESIGN 289, 302 (2021); Martin Reimann & Oliver Schilke, *Product Differentiation by Aesthetic and Creative Design: A Psychological and Neural Framework of Design Thinking*, *in* DESIGN THINKING: UNDERSTAND, IMPROVE, APPLY 45, 46 (Hasso Plattner et al. eds., 2011). *See also* Le Masson supra note 267, at 29; Brown, *supra* note 1, at 29 ("Great design satisfies both our needs and our desires").

305 Natalie Bonnardel & Carole Bouchard, *Creativity in Design*, *in* THE CAMBRIDGE HANDBOOK OF CREATIVITY ACROSS DOMAINS 403 (James C. Kaufman et al. eds., 2017).

306 NORMAN, *supra* note 267, at 71; Clayton Christensen, Taddy Hall, Karen Dillon & David S. Duncan, *Know Your Customer's "Jobs to Be Done,"* 94 HARV. BUS. REV. 54, 55 (2016); Le Masson, *supra* note 277, at 293.

307 V. Krishnan & Karl T. Ulrich, *Product Development Decisions: A Review of the Literature*, 47 MGT. SCI. 1, 8–9 (2001).

308 NEUHART & NEUHART, *supra* note 284, at 14 (interview with Charles Eames, who states "[d]esign depends largely on constraints").

309 KARL T. ULRICH ET AL., PRODUCT DESIGN AND DEVELOPMENT 79–80 (7th ed. 2020); NORMAN, *supra* note 267, at 74.

310 Pieter Desmet & Paul Hekkert, *Framework of Product Experience*, 1 INT. J. OF DESIGN 57, 61 (2007).

311 KAHNEY, *supra* note 174, at 220; *see also* Apple v. Samsung, Transcript of Proceedings before the Honorable Lucy H. Koh, No. C-11-01846 LHK, at 484 (July 31, 2012) [hereinafter "Stringer

sophisticated design processes are aimed to shape these experiences, which among other things include:

> . . . the entire set of effects that are elicited by the interaction between a user and a product, including the degree to which all our senses are gratified (aesthetic experience), the meanings we attach to the product (experience of meaning), and the feelings and emotions that are elicited (emotional experience).[312]

Designers are required to unfix their thinking to generate new possibilities to meet these challenges.[313] Solving such problems requires research and prototyping under constraints, which are design criteria that can change as the work progresses.[314] There is not always an easy path. The Equa chair's design took five years and went through 27 prototypes.[315] A decade later, these same two designers spent two years designing the Herman Miller Aeron chair, iterating the design through the creation of hundreds of versions.[316]

Creative design breakthroughs can lead to new knowledge that fuels subsequent innovation.[317] Legal incentives for solving these problems is consistent with the patent system as a whole and distinct from the purposes of copyright and trade dress law. Whether the incentive should be limited to the visual is another question. Designs play on sensory vocabulary aimed at their prospective users to invoke associations that aid them to understand the product's features.[318] This language has both emotional and cognitive components.[319] As one designer explains, "[e]ffective visceral design requires the skills of the visual and graphic artists and the industrial engineer. Shape and form matter. The physical feel and texture of the materials matter. Heft matters. Visceral design is all about immediate emotional impact."[320]

Some design elements are symbolic.[321] For example, bright colors can signal that a product is designed for children.[322] Other product solutions are capable of

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Testimony"]. (testimony of Apple designer Christopher Stringer, describing the beginning of the iPhone design process as a team approach where "we were looking for a new, original, and beautiful object, something that would really wow the world."); *see also* NORMAN, *supra* note 267, at 91.

312 Paul Hekker, *Design Aesthetics: Principles of Pleasure in Design*, 48 PSYCH. SCI. 157, 160 (2006).

313 Le Masson, *supra* note 277, at 291.

314 Reiman & Schilke, *supra* note 304, at 52–53; V. Krishnan & Karl T. Ulrich, *Product Development Decisions: A Review of the Literature*, 47 MGMT. SCI. 1, 8 (2001).

315 Lasker, *supra* note 290.

316 Alan S. Brown, *Iconic Design*, 29 MECH. DES. 29, 30 (2014).

317 Le Masson, *supra* note 277, at 279; Stumpf, *supra* note 174, at 35.

318 Hekkert, *supra* note 312, at 159.

319 Philip R. Ross & Stephan A. G. Wensveen, *Designing Behavior in Interaction: Using Aesthetic Experience as a Mechanism for Design*, 4 INT'L J. OF DESIGN 3, 4 (2010) (suggesting that "the whole human being is actively involved in the aesthetic experience, both the intellectual and bodily dimension.").

320 NORMAN, *supra* note 267, at 69.

321 Mariëlle E. H. Creusen & Jan P. L. Schoormans, *The Different Roles of Product Appearance in Consumer Choice*, 22 J. PROD. INNOV. MGMT. 63, 66 (2005) ("the product itself also can communicate symbolic value . . . by its appearance."); PICON, *supra* note 213, at 145–46 (using example from architecture).

322 Marie lle E. H. Creusen & Jan P. L. Schoormans, *The Different Roles of Product Appearance in*

communicating concepts that can include confidence, independence, and achievement as some examples.[323] A designer might work to evoke a connection between the user and the item.[324] Meaning can be derived from such qualities as lightness or warmth.[325] For example, a product made of uncoated aluminum can give the impression of smoothness, coolness, or utility.[326] A choice of materials can add aesthetic depth to a product, particularly if chosen to deliberately reimagine the product or add surprise.[327] Meaning can be derived from interactive movement.[328] As one source indicates, a well-designed drawer slider can convey "calm, confidence and purposeful activity."[329]

The field of aesthetics is no longer limited to the visual, rather it includes the full range of multisensory experiences by consumers.[330] As one designer explained, "[w]hat the hand reveals is as important as what the eye sees."[331] These may be required to anticipate end-user behaviors during user-product interactions over time.[332] This includes anticipating how a user's focus is best directed during each step of a product's use.[333] Tactile feedback, including haptics, can be important.[334] User experiences are formed on a first interaction and change as the product is used over time.[335]

Today, design has shifted to more closely resemble the processes undertaken by

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Consumer Choice, 22 J. PROD. INNOV. MGMT. 63, 66 (2005) (comparing two toothbrushes, one designed for children and another for adults).

323 Desmet & Hekkert, *supra* note 310, at 60.

324 *See, e.g.*, Susan E. Schultz, Robert E. Kleine, & Jerome Kernan, *These Are a Few of My Favorite Things: Toward an Explication of Attachment as Consumer Behavior*, 16 ADV. IN CONSUMER RES. 359, 366 (1989) ("Attachments often have to do with memories and previous self-definitional experiences as well as current or anticipated ones"); *see also* Pascalle C. M.Govers & Ruth Mugge, *"I Love My Jeep, Because Its Tough Like Me": The Effect of Product-Personality Congruence on Product Attachment*, *in* PROCEEDINGS OF THE FOURTH INTERNATIONAL CONFERENCE ON DESIGN AND EMOTION (Aren Kurtgözü ed., 2004) ("If a person identifies with this product image, (s)he will experience high self-congruence which positively influences product evaluation.").

325 Thomas J. L. Van Rompay & Geke D. S. Ludden, *Types of Embodiment in Design: The Embodied Foundations of Meaning and Affect in Product Design*, 1 INT'L J. OF DESIGN 1, 6 (2015).

326 Paul Hekkert & Elvin Karana, *Designing Material Experiences*, *in* MATERIALS EXPERIENCE: FUNDAMENTALS OF MATERIALS AND DESIGN 1, 4 (Elvin Karana et al. eds., 2013).

327 DENT & SHERR, *supra* note 5, at 64 (using sound as an example).

328 Rompay & Ludden, *supra* note 325, at 7 (observing that users can derive meaning from movement).

329 *Id.* at 8.

330 Dent & Sherr, *supra* note 5, at 64; CHRISTINE PARK & JOHN ALDERMAN, DESIGNING ACROSS SENSES 115 (2018).

331 Stumpf, *supra* note 174, at 42.

332 NORMAN, *supra* note 267, at 71; Hekkert & Karana, *supra* note 326, at 4; DENT & SHERR, *supra* note 5, at 9.

333 *Id.* at 161–62.

334 NORMAN, supra note 267, at 79; *See generally* Kristina Kampfer, Bjoern Ivens & Alexander Brem, *Multisensory Innovation: Haptic Input and Its Role in Product Design*, 45 IEEE ENG. MGT. REV. 32, 33 (Sept. 2017) (describing multisensory innovation); Burstein, *supra* note 13, at 170–71 (describing the broad reach of the industrial design field).

335 Desmet & Hekkert, *supra* note 310, at 60.

inventors of utility patents.[336] This includes a multidisciplinary effort that formulates problems, involves divergent and convergent thinking, and develops new information in the process.[337] Rather than adding or modifying already-engineered products, designers work with engineers and others toward the creation of the final product. In the Equa chair example, designers drove the engineering criteria. Design language has shifted from echoing past artistic styles toward user-centric interactivity that plays on the visual, as well as the multisensory.

It is unclear whether the current emphasis on the visual to capture design protection should continue. There are arguments—for and against—legal protection for non-traditional design features. Yet it is difficult to fully engage in the merits of this discussion when the patent system does not accept different media that claims more than non-static visual features. The opportunities to assess patentability will not occur because the patent system is not positioned to consider an application with such attributes. In contrast, the trademark office accepts both video and sound files.[338] Trademarks allow sensory marks that include scent and sound.[339] This tilts the current system to channel non-traditional design protection toward trademark and copyright law because those systems protect a broader range of media.

Across the intellectual property system, protection for non-traditional features might be better placed in the design patent system. Properly implemented, it offers several advantages for the protection of aesthetics. The patent system is better at forcing the disclosure of information that adds to the fund of available technical information generated by the creation of the design. The statutory disclosure requirements are already applicable to the design patent system. Requiring enablement and a written description of the design can compel the communication of information that other designers can find useful in solving problems that are outside the scope of protection of the patent at issue. The system is ideal for capturing the relevant information that has been learned along the way.

Using a more effective claiming system, design patents are more effective in providing notice of the scope of the right. As Prof. Fromer recognized, the copyright system's claiming mechanism has indeterminate boundaries.[340] This means that the protection of aesthetic features under copyright law is not optimal for those seeking to avoid infringement, given the lack of a clear boundary for assessing where

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336 *See generally* NORMAN, *supra* note 12, at 222 (describing a typical design process).

337 *Id*. at 229 (discussing the potential to learn from failures and iteration); Le Masson, *supra* note 277, at 278.

338 U.S. Reg. No. 5,259,308 (filing date Aug. 24, 2016) (specimen file is a computer graphic that shows images and sound for the ROLF INSTITUTE logo) at https://tsdr.uspto.gov/documentviewer?caseId=sn87149379&docId=SPE20160824160531#docIndex=16&page=1

339 U.S. Patent & Trademark Office, Trademark Manual of Examining Procedure § 904.03m.

340 Jeanne C. Fromer, *Claiming Intellectual Property*, 76 U. CHI. L. REV. 719, 748 (observing that "the copyright holder is not required to draft any claim describing the characteristics of some or all members of the set of protected embodiments.").

protection begins and ends. This same problem exists for trade dress.[341] Among the three forms of intellectual protection, the patent system has the statutory backing to require the most specific *ex ante* articulation of the scope of the right.[342] Such boundaries can limit transaction costs if specious infringement assertions can be determined before trial. Moreover, for designs that include non-visual features, defining the scope of the right using text, images, or other media and enforcing specificity through the definiteness requirement is particularly important to define the scope of the right.

Perhaps the most striking aspect of the current design patent standards is that it requires the barest amount of information in all forms. As the Equa chair example illustrates, its designers had a wealth of information that was never disclosed in its design patent.[343] Aside from four figures, the design patent disclosure has no text that describes the designer's aesthetic features. The material used to enable the claimed shape is not disclosed. One cannot perceive the chair's responsive flexibility from the figures. In other words, the patent system seeks only the barest information and is out of step with the design as implemented in the final product. In the Equa example, the aesthetic aspects of the shell are only partially evident in the image. A more detailed disclosure would have contributed more robustly to the fund of human knowledge and enabled a more meaningful application of the patentability standards and understanding of the claim.

V. The Lessons of the *Apple/Samsung* Dispute

The *Apple/Samsung* case is the most high-profile design patent case in recent years. This lawsuit concerned certain features of Apple's first iPhone that were claimed in various design patents.[344] When introduced in 2007, this product was the first widely available smartphone that eliminated physical keys in favor of a digital touchscreen.[345] Its original design was lauded to have "defined an era in consumer culture"[346] and won the prestigious Design and Art Direction organization's Black Pencil Award.[347] One prominent tech reviewer concluded that "the iPhone is, on

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341 Fromer & McKenna, *supra* note 15, at 150–151 (describing the problems).

342 35 U.S.C. § 112(b) (stating the definiteness requirement: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.").

343 U.S. Design Patent No. D289,120 (filed Feb. 17, 1984).

344 Stringer Testimony, *supra* note 311, at 473–74 (testimony of Apple designer Christopher Stringer, describing that the '087 and '677 design patents are incorporated into the first and some subsequent versions of the iPhone) (on file with author).

345 John Markoff, *That iPhone Has a Keyboard, but It's Not Mechanical,* NY TIMES (June 13, 2007), https://www.nytimes.com/2007/06/13/technology/13phone.ready.html.

346 Choe Sang-Hun, *After Verdict, Assessing the Samsung Strategy in South Korea,* NY TIMES (Sept. 2, 2012), https://www.nytimes.com/2012/09/03/technology/companies/south-korea-reassesses-samsung-after-battle-with-apple.html?searchResultPosition=2.

347 *Design & Advertising Direction (D&Ad) Black Pencil Award, iPhone*, DANDAD.ORG (2008), https://www.dandad.org/awards/professional/2008/product-design/16845/iphone/.

balance, a beautiful and breakthrough handheld computer."[348]

By this time, the role of design in the technology space had expanded in complexity. The days of merely adding a decorative stand to a sewing machine were long gone. Rather, the profession required an understanding of engineering, virtual space, and ergonomics.[349] Additionally, such "designers needed to understand people's emotional relationship with complex machines."[350] Perhaps more than in other sectors, the user's experience—including "a level of pleasure in those activities"—became central.[351] Design principles that include empathy, participation, and emotional durability ensure that electronics would connect with their users and would do so throughout the product's life.[352]

For some products, form is as important as its technical specifications.[353] Moreover, a simple design belies the level of problem-solving that was required to derive the final design. In some cases, the austerity is "simplicity on the other side of complexity" and therefore is the most successful design.[354] Such design can be the result of "many years of dogged research and developments in pursuit of changes in scale or new levels of performance."[355] For a product as complex as a smartphone, the simplicity of its operation is considered a positive quality.[356]

The *Apple/Samsung* story provides a useful lens for viewing the efficacy of the representation of design patent images. At one point, it highlights the complexity of designing in this era. This example highlights the mismatch between the Apple team's highly regarded product and the representations of its designs in the litigated patents. Because solutions to such problems are typically multisensory and experiential, they are remarkably difficult to communicate in a simplified drawing, particularly without explanatory text. In the process, some of the technological frailties of the current design patent system are brought to light.

A. The iPhone's Design History

Apple began designing its first iPhone in 2004.[357] The relevant design patents

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348 Walter Mossburg & Katherine Boehret, *Testing Out the iPhone,* WALL ST. J. (June 27, 2007), https://www.wsj.com/articles/SB118289311361649057.

349 SPARKE, *supra* note 206, at 135.

350 *Id.*

351 *Id.*

352 Jonathan Chapman, *Design for (Emotional) Durability*, 25 DESIGN ISSUES 29, 30 (2009); SPARKE, *supra* note 206, at 136.

353 Id.

354 United States v. Burlington N. & Santa Fe Ry. Co., 520 F.3d 918, 954 (9th Cir. 2008), *rev'd*, 556 U.S. 599 (2009) (quoting Holmes, J.).

355 Stumpf, *supra* note 174, at 42.

356 *See* R. L. G., *Beautiful Gadget, No Manual Necessary: The Rise of Intuitive High Tech*, ECONOMIST (Oct. 6, 2011), https://www.economist.com/prospero/2011/10/06/beautiful-gadget-no-manual-necessary ("After using an iPhone, there are few things more complicated than figuring out how to work a Blackberry.").

357 Apple v. Samsung, Transcript of Proceedings, No. C-11-01846 LHK at 740 (Aug. 3, 2012)

were filed three years later, in 2007.[358] The iPhone team's goals were to create a product that engaged with the end user's emotions.[359] In contrast to the nineteenth-century process that invoked design only after a product was engineered, the first iPhone was driven by Apple's design team.[360] The Federal Circuit described two of the design patents in suit as directed to "a minimalist design for a rectangular smartphone" and that the design contains no ornamentation aside from the pictured speaker slot.[361] This characterization is curious, given that design patent subject matter includes a variant of the statutory word "ornamental" and neither of these patents was challenged for the lack of it.[362]

B. The Design Patents in Suit

The first iPhone's visual appearance was dominated by a screen that had a black shiny surface and was created to have an "infinity pool illusion" that translates to an unbroken expanse of glass held in place by a narrow bezel.[363] This screen was designed to be a "single, unbroken, inky-black faceplate" when the phone was off.[364] Graphics would then "magically appear[] from within" when it was powered up.[365] As a multimodal device that allowed users to select applications with context-specific software experiences, the iPhone's overall design intentionally "deferred to the display" in a manner that was intended to be "surprising" to users.[366]

Unlike many of the prototypes, the first iPhone used a specific Corning glass that was both strong and scratch resistant.[367] This created a different aesthetic experience for users over the plastic versions used in the prototype phase.[368] This glass solution was perceptively heavier, smoother, and cooler than plastic and consequently contributed to the iPhone's striking appearance and the "dark, oily pond" of the touchscreen when the iPhone was inactive.[369] Further, the plastic screen had either a "weird flexibility" or a "waviness to it, which makes it look really crappy."[370] Apple's

(testimony of Apple engineer Scott Forestall).

358 U.S. Design Patent No. D558,756 (filed Jan. 5, 2007).

359 KAHNEY, *supra* note 174, at 220 (describing the iPhone's design goals as targeting "how [users] feel about the product, not in a physical sense, but in a perceptual sense."); *see also* Stringer Testimony, *supra* note 311, at 484 (testimony of Apple designer Christopher Stringer, describing the beginning of the iPhone design process as a team approach where "we were looking for a new, original, and beautiful object, something that would really wow the world.")

360 *See* KAHNEY, *supra* note 174, at 200 (describing designer Jony's design team, which absorbed engineers from other Apple divisions).

361 Apple, Inc. v. Samsung Elecs. Co., 678 F.3d 1314, 1317 (Fed. Cir. 2012).

362 35 U.S.C. § 171.

363 KAHNEY, *supra* note 174, at 224.

364 *Id.*

365 *Id.*

366 *Id.* at 221.

367 *Id.* at 227.

368 *Id.*

369 Stringer Testimony, *supra* note 311, at 521.

370 KAHNEY, *supra* note 174, at 226–27.

U.S. Design Patent D618,677 (the "'677 patent) claimed the iPhone's black front face:[371]

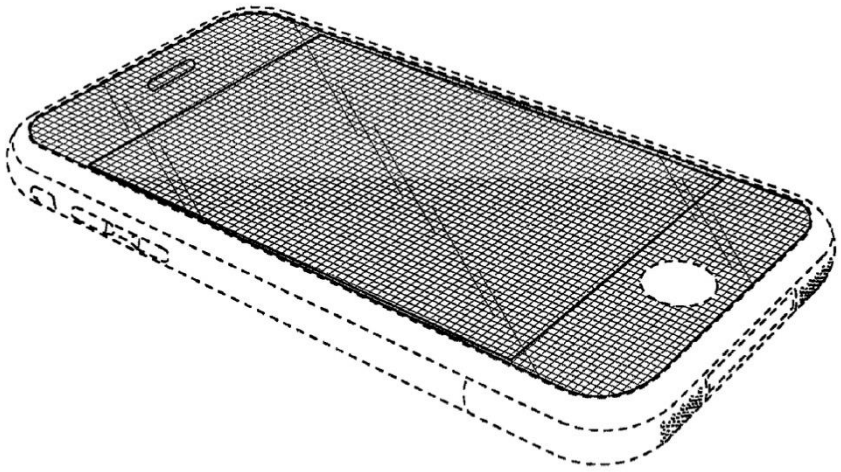

FIG. 1

What is striking about this image is how little of the iPhone design is depicted in the patent drawings. Typical of design patents, the issued ''677 patent does not specify the materials used, although the Corning glass enabled this appearance. The PTO does not have a mechanism for the inventor to submit moving images that would capture graphics that "magically appear[] from within" when the phone is powered on. The district court interpreted this image to encompass "a black surface that is also transparent, translucent, highly polished, or reflective."[372] Coupled with the lack of specification for the materials used, the disjunctive "or" suggests that the claim might encompass a highly polished plastic, even though this material was explicitly rejected by the designers. The lack of any lengthy written specification eliminates reference to its other qualities, such as weight, balance, and the contemplated mode of user interaction.[373]

The initial parent application described materials for the metal bezel, including aluminum, chrome, and nickel, but this information does not appear in the final issued patent.[374] No touchscreen materials were specified, although by this time Apple's

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371 U.S. Design Patent No. D618,677 (filed Nov. 18, 2008).

372 Apple v. Samsung, Order Regarding Design Patent Claim Construction. No. C-11-01846 LHK, at 9 (July 27, 2012).

373 NORMAN, *supra* note 267, at 69 (discussing a user's sensory experiences as part of the designer's role).

374 U.S. Design Patent Application 29/27088, at 2 (filed Jan. 5, 2007) and U.S. Design Patent No. D558,756 (filed Jan. 5, 2007).

decision to use the Corning glass was solidified.[375] During prosecution, the initial filing was supplemented with ninety-two drawings depicting twelve separate embodiments.[376] Despite this wealth of available detail, Apple ultimately narrowed the claim to the highly reductive touchscreen image in the ‘‘677 patent.[377]

Apple had significant information about the design's appearance before the parent design application was filed. That date was January 5, 2007.[378] Certainly, a working prototype existed mere days later when Steve Jobs demonstrated a working version on stage at Macworld 2007.[379] Indeed, six months before this filing, Apple had already created full-color computer-aided design drawings.[380] One of these is pictured here, with an informational specificity that is lacking in the design patent's line drawings.

[375] U.S. Design Patent No. D618,677 (filed Nov. 18, 2008); KAHNEY, *supra* note 174, at 227–28 (describing that Apple began working with Corning to make the screen's glass in 2006).

[376] Tracy-Gene G. Durkin, Letter to Patent & Trademark Office, Submission of Drawings, Appl. 29/282,833 (Nov. 30, 2007); Bridget L. Eland, Office Action Summary for U.S. Patent Application No. 29/282,833, at 2 (May 27, 2008).

[377] U.S. Design Patent No. D618,677 (filed Nov. 18, 2008).

[378] The '677 patent was filed as a continuation of Application No. 29/27088 (the "'088 application"), filed January 5, 2007. The '088 application issued as the U.S. Patent No. D558,756 (filed Jan. 5, 2007).

[379] *iPhone at Ten: The Revolution Continues*, APPLE.COM (Jan. 8, 2017), https://www.apple.com/newsroom/2017/01/iphone-at-ten-the-revolution-continues.html.

[380] Plaintiff's Exhibit No. 162, Apple Inc. v. Samsung Elecs. No. 11-CV-01846-LHK (PSG) (N.D. Cal. July 29, 2012); *see also* Stringer Testimony, *supra* note 311, at 452 (authenticating Exhibit 162 dated April 20, 2006).

In addition to a richer depiction of the infinity pool design, the glossy, smooth black screen is dotted with the app's icons as well as their contemplated placement. These computer-aided design drawings were not submitted to the PTO.[381] Instead, these color photographs accompanied the ''677's parent application:

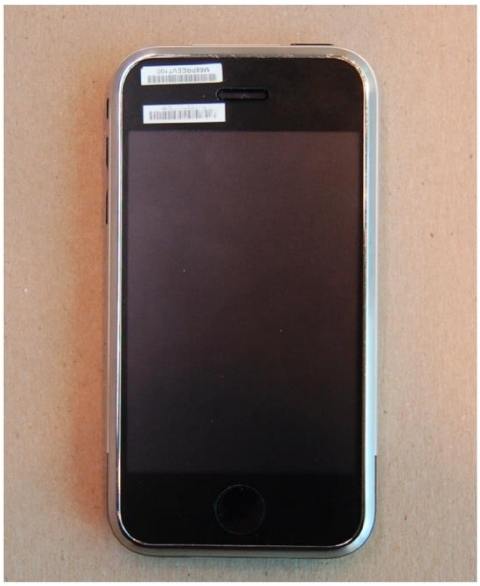

FIGURE 11

FIGURE 12

According to the PTO, these photographs could not be reproduced legibly.[382] Instead, Apple's claims relied on black and white line-drawn images, one of which (Figure 1) is shown here. The simplified drawing allowed Apple to claim more broadly and therefore obtain a more powerful patent claim. A simple drawing can be asserted against a far broader range of devices, including any with the same simple black screen even if different materials or an alternative icon layout is used. This illustrates that, given that a design patent's claim defaults to the image to define the scope of the right, the level of detail in the image impacts its scope. Further, these photographs demonstrate at the time of filing Apple knew precisely how the design would be implemented into a final iPhone version.

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[381] *See* U.S. Design Patent No. D558,756 (filed Jan. 5, 2007). Instead, the initial '088 application was accompanied by color photographs that could not be legibly reproduced. Artifact Sheet, U.S. Design Patent Application No. 29/270888 (filed Jan. 5, 2007); U.S. Design Patent Application No. 29/27088, Drawings Only (filed Jan. 5, 2007).

[382] The initial '088 application was accompanied by color photographs that could not be legibly reproduced. Artifact Sheet, U.S. Design Patent Application No. 29/270888 (filed Jan. 5, 2007); U.S. Design Patent Application No. 29/27088, Drawings Only (filed Jan. 5, 2007).

Apple's Design Patent D593,087 (the "'087 patent") has the same effective filing date as the ''677, a date that was after Apple created the iPhone computer-aided design drawings and just days before the prototype was publicly demonstrated.[383] As issued, the '087 claimed certain aspects of the front on the iPhone, including its bezel.[384] This was designed to enable and surround the iPhone's touchscreen. Like the '677 patent application, this design was represented by simplified drawings that lacked any specificity as to the texture, color, or materials.[385]

Despite the spare detail, the agency rejected some of the submitted drawings because the lines were too crowded and would not be reproducible in the printed patent.[386] A comparison of the earlier image (labeled as Figure 91) with the substituted image labeled as Figure 43) is below:

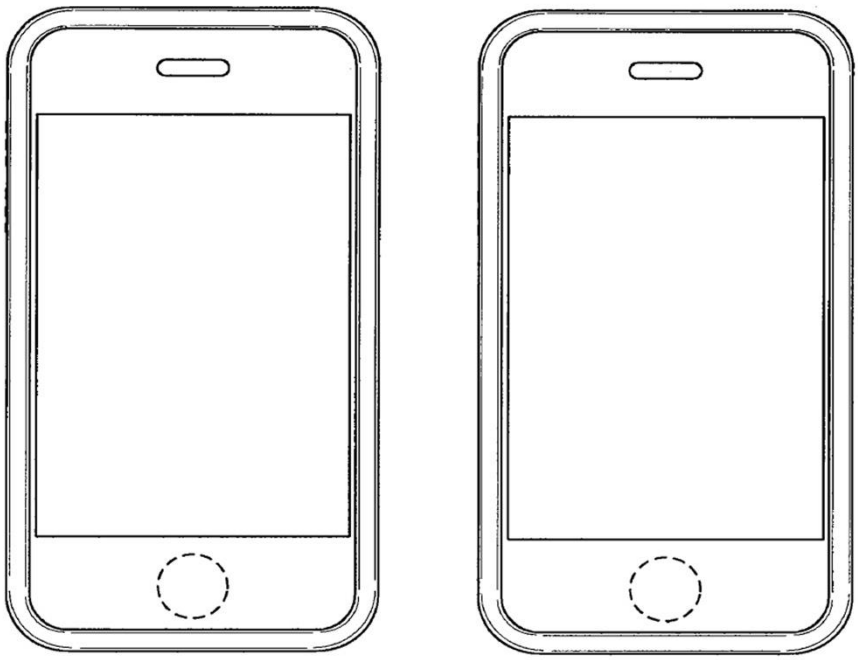

FIG. 91

FIG. 43

[383] U.S. Design Patent No. D593,087, at 1 (filed June 30, 2007) (describing that the patent was filed as a Continuation of U.S. Design Patent Application No. 29/270.880, filed on Jan. 5, 2007).

[384] U.S. Design Patent No. D593,087 (filed June 30, 2007).

[385] *Id.*

[386] Bridget L. Eland, Office Action for U.S. Patent Application No. 29/282,833 at 3 (Nov. 24, 2008) (stating that the lines were "jagged" and that "[d]etails of the design are lost when double lines blend together into one thick line" in an issued patent.").

Figure 43 was accepted by the agency and appears in the issued patent.[387] This comparison demonstrates the fragility of the PTO's system for reproducing images. Specifically, Figure 91 was rejected even though it does not appear to be overly detailed, visually complex, or significantly different from Figure 43.

The iPhone's metal bezel was designed in a "shiny stainless steel" to "give the iPhone strength, but also needed to look good."[388] This material and texture placed visual emphasis on the iPhone's screen, unlike a prior bezel that was rejected by the designers as "too distracting."[389] That the bezel's material became important to the team because it was used to pull the user's attention away from certain features of a product and toward others.[390] As can be seen by the figure, above, reducing the design to a simple structural outline erases this information, fails to capture these this feature, and results in a broad claim.

Instead, the drawn bezel shape effectively protects the negative space within it, where the iPhone's touch screen resided. In one sharply worded critique of this patent, "[t]he Federal Circuit's decisions upholding the validity of Apple's design patents for the minimalist shape and appearance of the iPhone and iPad illustrate how far the design patent regime has strayed from the fundamental logic and structure of the intellectual property system."[391] Yet it must be appreciated that the form of representation drained this design of important aesthetic attributes that were deliberately created by the Apple design team. In other words, the subtle and expressive design language in the final product was disappeared to fit the rules drafted for the last century's conception of design.

C. Lessons to be Drawn

The '677 and '087 patents are not anomalies. Rather, they followed the path of least resistance under the PTO's current rules. To prioritize reproducibility, the rules state that black-and-white drawings are "normally required."[392] Such images must be created with lines that "permit adequate reproduction," which discourages the addition of rich detail.[393] The default mode of representation yields the sparest details. The system does not require patentees to include information that is known to them at the time that the application is filed. At the same time, the trend in design patents minimizes the amount of text. This places primary emphasis on the images, which can be remarkably uninformative.

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387 U.S. Design Patent No. D593,087, Fig. 43 (filed June 30, 2007).

388 KAHNEY, *supra* note 174, at 228.

389 *Id.* at 222.

390 Elvin Karana & Paul Hekkert, *User-Material-Product Interrelationships in Attributing Meanings*, 4 INT'L J. OF DESIGN 43, 44 (2010) (describing that "people may not perceive a material's expressive meaning if a material is mainly used for its physical appropriateness in a product"); KAHNEY, *supra* note 174, at 221 (describing that the iPhone's overall design was intended to "defer[]to the display.").

391 Menell & Corren, *supra* note 15, at 5.

392 37 C.F.R. § 1.84(a)(1) (stating "[b]lack and white drawings are normally required. India ink, or its equivalent that secures solid black lines, must be used for drawings.").

393 37 C.F.R. § 1.84(l).

This circumstance is curious, given that the patent system is exceptionally suited to facilitate disclosure.[394] Statutory requirements oblige patentees to fully describe their inventions and the information associated with their implementation.[395] This forces utility patentees to provide detailed information about their advances in their patent applications.[396] When properly enforced, these requirements encourage applicants to add to the world's storehouse of available knowledge.[397] The PTO, the courts, and the public are then better able to understand the patent's claims.[398] Currently, the validity standards for design patents are far more lenient than comparable standards for utility patents.[399]

The design patent system tolerates representations that border on the vague, ambiguous, and illegible. Yet the statutory disclosure requirements for utility patents formally apply to design patents.[400] They are not robustly enforced for design patents. For example, in *In re Maatita*, the Patent Trial and Appeal Board ("PTAB") affirmed an Examiner's rejection of an application to protect a portion of a sneaker sole.[401] This drawing depicted rounded shapes in a single plane; in other words, it was impossible to determine whether the shapes were raised, sunken, level, or a combination of these with the sneaker's bottom.[402] The PTAB affirmed the rejection because the single drawing was of poor quality, given that the "topography of the claimed surface cannot be discerned."[403] Further, the PTAB found that the claim was indefinite and not enabled because the visual representation invited mere conjecture about the claimed design's scope.[404] Recognizing that the drawing pictured shapes that "could be flat, concave, convex, or some combination," the Federal Circuit nonetheless found the drawing adequate because it was "capable of being understood."[405] The remarkably low bar requires competitors to imagine which of those three were intended. The standard allows vague drawings to pass the statutory requirement. As one source describes, "current Federal Circuit law makes it nearly impossible for the USPTO to reject most design patent claims."[406]

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394 Capon v. Eshhar, 418 F.3d 1349, 1357 (Fed. Cir. 2005); Timothy R. Holbrook, *Possession in Patent Law*, 59 SMU L. REV. 123, 125 (2006).

395 35 U.S.C. § 112; *In re* Maatita, 900 F.3d 1369, 1375 (Fed. Cir. 2018).

396 Holbrook, *supra* note 394, at 131.

397 *Id.*

398 Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1345 (Fed. Cir. 2010) (compliance allows the PTO "to examine applications effectively; courts to understand the invention, determine compliance with the statute, and to construe the claims; and the public to understand and improve upon the invention and to avoid the claimed boundaries of the patentee's exclusive rights.").

399 Burstein, *supra* note 15, at 610.

400 *In re* Maatita, 900 F.3d at 1375; Du Mont & Janis, *supra* note 73, at 654.

401 *Ex parte* Maatita, U.S. Patent & Trademark Office Patent Trial and Appeals Board, Appeal 2015-005829, Application No. 29/404,677, p. 7 (PTAB Mar. 29, 2017).

402 *Id.* at 3.

403 *Id.* at 6.

404 *Id.*

405 *In re Maatita*, 900 F.3d at 1378.

406 Burstein, *supra* note 15, at 611.

As previously detailed herein, the original shift toward simplified drawings was implemented to facilitate public notice when printing technology was nascent. However, both the state of technological means of reproduction have changed, as well as design practices. As *Maaita* shows, the courts have been lenient in enforcing the disclosure requirements. The rules based on those developed a century ago may no longer serve the public notice function. Concomitantly, the rules progressively lead applicants to submit drawings that give them the broadest claim scope. The path of the PTO's rules leads all patentees toward the most simplified drawings as the preferred standard. Eliminating detail is comparable to deleting elements in a utility patent claim—that is, it makes the claim broader. Further, these rules erase information that the patentee likely already possesses. Perhaps to preserve the public notice function by ensuring reproducibility, the agency sacrifices full information about its design. In the process, design patent owners are permitted to claim broadly in a manner that is contrary to the public interest.[407]

Perhaps most troubling, the system is not capable of capturing many design types. In the *Apple/Samsung* case, these reductive drawings seemed entirely disconnected from the design team's understanding of the user experience that they had endeavored to create.[408] By this point, the concept of design was no longer limited to decorating products after engineering was complete. Today, design is an integrated discipline that works with aesthetics and engineering.[409] Design centers on the end-user experience with the product.[410] User experiences change over time.[411] Multisensory experiences contribute to a product's signals.[412] These include haptic signals that send vibrational or other feedback to users in different ways.[413] Yet the rules for capturing design work in the patent system have not been updated to account for these attributes. To the extent that the law determines that more exploratory design forms are—or are not—eligible for protection, that decision should be made consciously.

Design has evolved beyond the beaux-arts style in vogue at the time "ornamental" was added to the design patent statute. If anything, the iPhone's design was the

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[407] Kelly Casey Mullally, *Patent Hermeneutics: Form and Substance in Claim Construction*, 59 FLA. L. REV. 333, 366 (2007) ("Both patentees and the public have a legitimate interest in a clearly defined and bounded patent right. A lack of certainty can impede investment and have an in terrorem effect on innovation."); James Bessen & Michael J. Meurer, *The Patent Litigation Explosion*, 45 LOY. U. CHI. L.J. 401, 403 (2013).

[408] *See* Stringer Testimony, *supra* note 311, at 188 (discussing the iPhone design as "defining the experience that a customer has when they touch and feel our products.").

[409] Desmet & Hekkert, *supra* note 310, at 57 ("Design research takes a special place because design is an integrated discipline that requires aesthetic, marketing, ergonomic, and engineering skills.").

[410] *Id.* at 57*;* NORMAN, *supra* note 267, at 71("The first step in good behavioral design is to understand just how people will use the product").

[411] Hekkert & Karana, *supra* note 326, at 16.

[412] Kampfer, *supra* note 334, at 34; Hekkert & Karana, *supra* note 326, at 22–23.

[413] *See generally* Kampfer, *supra* note 334, at 33 (describing multisensory innovation); Burstein, *supra* note 13, at 170–71 (describing the broad reach of industrial designs); Martyn Reding, *Designing Haptic Responses*, MEDIUM (June 16, 2020), https://medium.com/@martynreding/basics-of-designing-haptic-responses-63dc6b52e010.

first giant step toward a time when "hardware fulfills its promise and simply gets out of the way" and the glass is chosen to "contain an experience."[414] In many cases, designs are intended to encourage users to engage in certain behaviors.[415] To accomplish this, designers use visual and tactile cues rather than text.[416]

Two-dimensional, static drawings with minimal text cannot capture design that is intended to impact end-user behavior. Perhaps the most striking aspect of Apple's case against Samsung was the potential impact that it might have had on all touchscreen users. Ultimately, Apple's suit did not lead to an injunction that prevented Samsung from integrating a large touchscreen into its products.[417] If it had, the gestures that have become both universal and familiar might have been accessible solely to Apple users.[418] Current design principles are about more than the objects that they protect because they are interactive. The iPhone touchscreen design changed human behavior.

More generally, this demonstrates that current rules for representing design are both overinclusive and underinclusive. The defaults encourage patentees to claim with images that lack detail and brief textual descriptions, resulting in claims with exceptionally broad reach. The rights that issue under these practices are thus overinclusive and out of step with the requirements imposed on utility patents. Yet this system fails to capture fundamental attributes of current design thinking and is therefore underinclusive. Given the increasing importance of design patents, the law should update its understanding of the limitations and possibilities of representation and the scope of existing design practices.

VI. Mooring Design Patent Protection

As previously described, the design field has moved toward centering the user's experience both functionally and aesthetically. The benefits of this approach offer a competitive advantage and encourage an emotional connection to the product, clearer and satisfying product interactions, and communication.[419] The collective

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[414] Say Daily Editors, *The Age of the User Interface*, SAY DAILY (Mar. 6, 2014), https://www.saydaily.com/2013/02/design-really-is-everything-now.

[415] Hekkert & Karana, *supra* note 326, at 4 (suggesting that the designer's work is "to decide what experiential and/or behavioral effects the product will have on people").

[416] *See* COLIN WARE, VISUAL THINKING FOR DESIGN 145 (2008) (describing that communication of some instructions and ideas is best expressed visually); Hekkert & Karana, *supra* note 326, at 18 (discussing the role of touch in user-product interactions).

[417] See generally, Apple Inc.'s Brief in Opposition to Petition for Writ of Certiorari, U.S. Supreme Court, No. 16-1102 (5/2017) (stating that the limited injunction issued in the district court "had no meaningful impact on Samsung" as one patent had expired, and other enjoined features were subject to alternative non-infringing implementations). As this brief explained, the injunction "in fact only barred Samsung's use of *specific features* that were found to infringe Apple's patents-in-suit.").

[418] PARK & ALDERMAN, *supra* note 330, at 21 (observing that for computing electronics, the shift to the use of screens was profound including "its impact to our collective behavior").

[419] NORMAN, *supra* note 267, at 19 (considering that positive emotions can assist user's understanding and behavior toward the product); Michael G. Luchs, Jacob Brower & Ravindra Chitturi, *Product*

understanding of the statutory word "ornamental" should, as a matter of legal understanding, broaden if the system is to retain its statutory purpose. To fail to do so risks a continued push of the design patent system toward irrelevancy. Below are several proposed solutions that follow from the analysis in this Article.

A. What is Design Patent Subject Matter?

There is a definitional vacuum for the statutory term "ornamental."[420] By applying a subtractive test that considers a design ornamental so long as it is not functional, the courts have essentially allowed broad protection by default. Not all designs are ornamental, nor are all portions of a design are worthy of protection. The term ornamental should encompass all aesthetic design, defined as features or entire products that solve aesthetic problems. Some include those that communicate, evoke an emotion (whether positive or negative), act as symbols, or create user experiences. One may derive aesthetic nourishment from some designs, in a way that elevates, eases, or creates meaning.[421] It can involve aesthetic insight—that is, learning information through the senses rather than through logical or rational ways of obtaining it.[422] Color, dimensionality, materials, weight, balance, and textures should be considered. As one example, products create aesthetic experiences in both quiet and noisy ways, including visual, auditory, and textual. Elegant aesthetic execution can draw the user's attention to possible uses, either powerfully or reservedly by eliminating distraction. This definition is not intended to be limiting or exclusionary, but the beginning of a meaningful design vocabulary that makes sense in the current design climate.

In determining ornamentality, certain Federal Circuit cases have avoided a component-by-component analysis of ornamentality and instead consider designs as a whole.[423] When combined with the test for infringement, which may also consider designs as a whole, design patents have legal power that includes features that should be deemed unprotectable.[424] This is because they lack statutory subject matter by lacking ornamentality.[425] Certainly, this concern is important to ensure that the patent

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Choice and the Importance of Aesthetic Design Given the Emotion-laden Trade-off between Sustainability and Functional Performance, 12 J. PROD. INNOV. MGMT. 903, 914 (2012).

420 McKenna, *supra* note 14, at 205 (noting the law's blurred understanding of the difference between the ornamental and functional).

421 HARPER, *supra* note 11 at 123.

422 *Id.* at 115 (defining aesthetic insight).

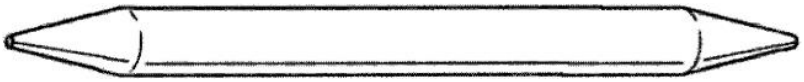
423 Amini Innovation Corp. v. Anthony California, Inc., 439 F.3d 1365, 1371 (Fed. Cir. 2006); *In re* Levy, 310 F.2d 751, 752 (C.C.P.A. 1962) (for design patents, "the patentability of a design must be based upon the design as viewed as a whole.").

424 Menell & Corren, *supra* note 15, at 214.

425 Carl J. Hall, *A Patently Offensive Test: Proposing Changes to the Test for Design Patent Infringement,* 53 VAL. U. L. REV. 297, 319 (2018); Menell & Corren, *supra* note 15, at 214 (criticizing the overbroad use of this test in assessing functionality). But see Jason J. Du Mont & Mark D. Janis, *Functionality in Design Protection Systems,* 19 J. INTELL. PROP. L. 261, 272 (2012) (observing that the test is applied inconsistently, arguing that consideration of the design as a whole is more consistent with the design patent system).

system is operating as intended—that is, extending protection to the ornamental features but no more. The law should consider that some designs (or specific design features) simply do not pass and are, therefore, neither functional nor ornamental. The two examples, below, illustrate this point.

In re SurgiSil is a Federal Circuit decision that considered a design application for lip implants, focused on whether the design claimed an "article of manufacture" without considering whether the design was ornamental.[426] The application's drawing appears below[427]:



Another is a patent[428] for the cover of a rock-dust blower.[429]

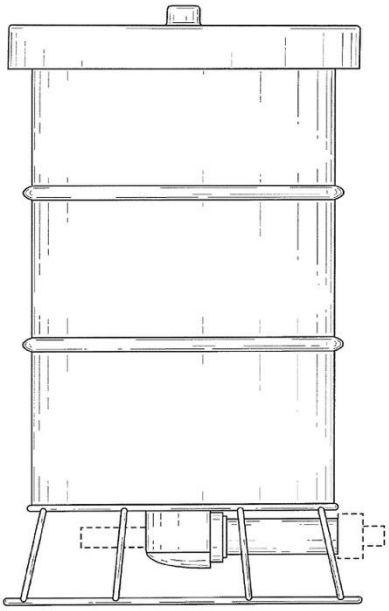


FIG. 1

Neither appears to include anything that meets the law's ornamentality requirement, whether analyzing the figures as a whole or on a component-by-component basis. Although the court would not be expected to raise a subject matter challenge sua sponte, there is scant authority that would have supported one in any event. The

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426 *In re* SurgiSil, L.L.P., 14 F.4th 1380, 1382 (Fed. Cir. 2021).

427 *Id* at 1381.

428 U.S. Design Patent No. D681,684 S1 (filed Oct. 18, 2011).

429 Hafco Foundry & Mach. Co., Inc. v. GMS Mine Repair & Maint., Inc., 953 F.3d 745, 746 (Fed. Cir. 2020).

current law does not appear to allow for the possibility that a design fails to meet the test for functionality, yet is not sufficiently aesthetic to be ornamental. For example, the lip implant and rock-dust blower cover designs might not be classified under the Federal Circuit's test as purely functional.[430] Yet, in the absence of some explanatory information, neither image appears to include anything aesthetic. This stands in contrast to the utility patent system, which has a robust standard for sifting out unprotected subject matter.[431] For design patents, even the most prosaic objects pass through the system.

To solve this problem, one work proposes a filtration analysis that affirmatively requires a separation of the functional and the ornamental.[432] This Article proposes an additional refinement. Specifically, this proposal suggests three categories of design patent analysis: 1) ornamental; 2) functional; and 3) neither. Breaking up the subject matter categories into three permits a "neither" category that is true to the statutory requirement for ornamentality. In this way, a subject matter test for design patents better correlates legal protection with a design that satisfies the statutory qualification. The application should contain a sufficient explanation to support this requirement, either in text or another appropriate medium. This will then become part of the published final patent and best serves the public notice requirement.

Asking patentees to specifically delineate the subject matter in their applications will better serve the statutory aim to protect the aesthetically creative aspects of a design, and no further. Because this requires separating the ornamental from features that offer virtually nothing, the sufficiency of a patentee's assertion will necessarily be assessed and articulated, just as it is in the utility patent context. Undoubtedly, these categories may overlap for some features that include pieces of both. For example, a plausible argument can be made that the H-supports on the Equa chair have both ornamental and functional aspects.[433]

The Federal Circuit has proven to be remarkably articulate in assessing the highly complex issues that arise in the utility patent context.[434] Parallel expertise in design patents will undoubtedly emerge in their opinions, to the extent that such proficiency might not already exist.[435] This is particularly true for consumer products, where the design vocabulary is aimed at the ready understanding of a non-specialist

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[430] Sport Dimension, Inc. v. Coleman Co., 820 F.3d 1316, 1322 (Fed. Cir. 2016) (describing the test); Menell & Corren, *supra* note 15 at 234 (describing the Federal Circuit's application of the functionality test as too difficult to meet and causing the law to "veer away from Congress's intent to ensure that design patent law did not protect functional features").

[431] 35 U.S.C. §101; Alice Corp. Pty. v. CLS Bank Int'l, 573 U.S. 208 (2014).

[432] *Id.* at 227.

[433] A full treatment of this issue is outside the scope of this Article although it will be the subject of later work.

[434] *See* Paul Gugliuzza, *Saving the Federal Circuit,* 13 CHI.-KENT J. INTELL. PROP. 350, 369–70 (2014) (discussing the court's expertise).

[435] Brian Soucek, *Aesthetic Judgment in Law,* 69 ALA. L. REV. 381, 386 (2017) ("Aesthetic judgment is no more daunting than many of the other judgments—economic, technical, and historical ones, for example—that generalist courts are regularly called upon to make.").

audience. Although decision-makers are not bound by the explanation provided by the patentee, just as in the utility patent context, the patentee's statement of articulation will assist decision-makers by providing a starting point for the analysis.

B. Enforcing Disclosure and Alternative Media

There is room to allow more informative media as part of the patent document, as well as the claims.[436] One option is fully opening the types of media that can be submitted, including a mix of different types as appropriate. This alternative should be exercised in conjunction with the use of upgraded printed and electronic technology by the agency. Additionally, such alternatives can be expressly encouraged to meet robust disclosure requirements. In practice, designers generate computer-aided design drawings to create virtual prototypes.[437] Indeed, at least one major firm creates drawings in support of design applications relying on either computer-aided design drawings (or similar) or prototypes.[438] Under the current system, it is possible to submit such media during prosecution, but such information would rarely—if ever—be incorporated into the issued patent as an explanatory disclosure. This should be reconsidered. More generally, the agency should encourage multiple, alternative forms of representation for a fuller explanation of the invention that is published in issued design patents.

One difficult question is the extent that text should be incorporated. Long ago, the Supreme Court prioritized a design patent's figures as the essential means of claiming.[439] The PTO counsels that only a brief written description of the drawing is typically necessary because the figure is the design's "own best description."[440] The Federal Circuit suggests that design patents are primarily visual and therefore words are not terribly useful to describe the claimed design.[441] Currently, the drawing defines the claim.[442] In effect, this system is less informative than copyright's registration system, where a deposit of the work is sufficient to support the registration and

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436 Buccafusco, *supra* note 15, at 134 (suggesting that photographs or CAD drawings be submitted).

437 D. BRYDEN, CAD AND RAPID PROTOTYPING FOR PRODUCT DESIGN 7 (2014) ("CAD and RP [rapid prototypes] now play a central role in design development and are a fundamental part of the professional practice of product design").

438 Conversation with Richard Kirkpatrick, owner of Patent Designs (Aug. 18, 2021) (notes on file with author); *see generally Pricing Guide*, PATENT DESIGNS, http://www.patentdesigns.net/47-2/pricing-contact/ (last accessed on Mar. 28, 2022) (listing acceptable media to begin a project).

439 Dobson v. Dornan, 118 U.S. 10, 14 (1886).

440 MPEP § 1503.01 (8th ed. 2006) ("[A]s a rule the illustration in the drawing views is its own best description.").

441 Egyptian Goddess v. Swisa, 543 F.3d 665, 679 (Fed. Cir. 2008); Crocs, Inc. v. Int'l Trade Comm'n, 598 F.3d 1294, 1302 (Fed. Cir. 2010) ("claim construction must be adapted to a pictorial setting").

442 Pac. Coast Marine Windshields Ltd. v. Malibu Boats, LLC, 739 F.3d 694, 702 (Fed. Cir. 2014); *Crocs*, 598 F.3d at 1302 ("[d]epictions of the claimed design in words can easily distract from the proper infringement analysis of the ornamental patterns and drawings."); *but see* Curver Luxembourg, SARL v. Home Expressions Inc., 938 F.3d 1334, 1341 (Fed. Cir. 2019) (recognizing the rule that the figure controls the scope of the design right, but recognizing that the identity of the article of manufacture can be ascertained from the patent's text).

there is no inquiry into the creation of the work.[443] Design patents do not require a deposit and only the sparest drawing of the product is sufficient.[444]

The current system does not require a robust textual disclosure. Nonetheless, text can be useful to meet the patent system's statutory requirements particularly if one is robustly enforced.[445] For example, a utility patent must describe how the claimed invention is made, while design patents do not require that the applicant disclose how the aesthetic aspects of the design are accomplished.[446] This disparity suggests that one of ordinary skill in the design arts would intuitively know how to recreate the claim. Such an assumption might hold for certain types of designs. However, this is far less likely to be true for designs that require complex knowledge or the development of entirely new materials.[447] For designs that depend on new technology, enabling information should be required, just as it is in the utility context. Similarly, the written description requirement should compel sufficient information to describe possession of the invention.[448]

There is an efficiency in allowing designers to reduce their drawings to simple lines and requiring little text. Undoubtedly, this makes the design system less expensive, particularly for simple decorative designs. Yet these reductive drawings result in a loss of information that would enrich the field and the design patent system. More information would lead, in turn, to a fuller source of information for the application of the statutory subject matter, novelty, and nonobviousness requirements. In certain cases, a claim may require textual supplementation to fully capture an understandable representation of the claimed design.

Printing and virtual reproduction, including data storage capability, has advanced considerably since the 1800s. Today, there are few technical limitations to issuing patents with more complete disclosures and more legible images. More creative design trends have evolved into "a segmented profession to a field for technical research" and are fully integrated with other disciplines, including engineering, materials science, as well as human psychology, and biology.[449] Advanced design

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443 17 U.S.C. § 407.

444 Buccafusco, *supra* note 15, at 134.

445 35 U.S.C. § 112; 3 CHISUM ON PATENTS § 7.01 (2021).

446 Du Mont & Janis, *supra* note at 73, at 1661 ("There is no indication that the courts or the PTO are poised to adopt a technical enablement-to-make standard. The law has moved in the opposite direction."); see also Reddy v. Lowe's Cos., Inc., 60 F. Supp. 3d 249, 258 (D. Mass. 2014) (design patents are not required to disclose "'foundational material' (e.g., the material of which the product is made).").

447 Viviana Lebedinsky, *Imagining New Materials: Design as Puzzle-Solving*, 24 J. MATERIAL CULTURE 194, 196 (2018) (discussing the creative process of creating new materials).

448 35 U.S.C. §112; Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1349 (Fed. Cir. 2010) (describing the written description test for utility patents).

449 Zahari Taha, Hassan Alli & Salwa Abdul-Rashid, *Users Involvement in New Product Development Process: A Designers' Perspectives*, 10 IND. ENG. AND MGMT. SYS. 191, 193 (2011); Karl T. Ulrich, *Design is Everything?*, 28 J. OF PROD. INN. 394, 395–98 (2011).

projects can push scientific inquiry forward.[450] Although many of the groundbreaking results of those efforts undoubtedly belong in the utility patent system, others are integrated into aesthetic solutions. As one example, the Equa chair shell was formed with a thermoplastic polymer that required the development of a formation method that required that the "fibers of glass in this material lined up parallel to the highest stress area of the shell," to enable the "H" cutout area and further contributed to the playful aesthetic of the final product.[451] Unlike the copyright and trade dress areas of IP law, which do not have statutory disclosure requirements, the design patent system is uniquely suited to require detailed information that ultimately that contributes to the fund of human knowledge.

If a design patent is litigated, textual descriptions will inevitably be made in briefing various matters, as well as in-court arguments.[452] Such descriptions are decidedly possible and should be in the patent application in an adequate form.[453] As the *Apple/Samsung* slides show, the patent applicant may already possess a considerable amount of information about their design.[454] The creative process generates information in the forms of data, feature optimization information, prototypes, computer-aided design, or other design drawings, and specifications.[455] As one source describes, "[t]he design process, especially creative design, involves the use of visual imagery using pencil-paper or digital freehand tools."[456] Patent drawings are frequently created from the byproducts of the design process, including prototypes or CAD-style drawings.[457] At the time of filing, the applicant is in a better position to describe all of the aspects of their designs through any number of means. The current system operates as strict liability, offering only a few defenses and no fair use exceptions.[458] Under these circumstances, the burden of disclosure falls more appropriately

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450 Buchanan, *supra* note 9, at 8 (design "extends into the core of traditional scientific activities, where it is employed to cultivate the subject matters that are the focus of scientific curiosity").

451 Houseman, *supra* note 286, at 21.

452 Fromer & McKenna, *supra* note 15, at 183 (discussing that visual claims "are always supplemented in litigation by some degree of verbal claiming. This verbal claiming can helpfully focus attention on certain features, or it can distract from other pertinent features.").

453 Clarissa Long, *Information Costs in Patent and Copyright*, 90 VA. L. REV. 456, 490 (2004).

454 Senthil K. Chandrasegaran, Karthik Ramania, Ram D. Sriram, Imre Horvath, Alain Bernard, Ramy F. Harik & Wei Gaoa, *The Evolution, Challenges, and Future of Knowledge Representation in Product Design Systems*, 45 COMPUTER-AIDED DESIGN 204, 206 (2013) ("By the end of the design process, there is substantial information accumulated that would potentially be useful for future designs if this information were sent back to the designer at earlier stages in the design process.").

455 *Id.* at 206.

456 *Id.* at 210.

457 Conversation with Richard Kirkpatrick, owner of Patent Designs (Aug. 18, 2021) (notes on file with author); *see generally Pricing Guide*, PATENT DESIGNS, http://www.patentdesigns.net/47-2/pricing-contact/ (last accessed on Mar. 28, 2022) (listing acceptable media to begin a project).

458 William J. Seymour & Andrew W. Torrance, *(R)evolution in Design Patentable Subject Matter: The Shifting Meaning of "Article of Manufacture"*, 17 STAN. TECH. L. REV. 183, 214 (2013) ("design patent law contemplates no fair use exceptions, and patent infringement is a strict liability offense").

on the patentee before obtaining the right rather than on the public.[459]

Relevant information in patent applications has been said to facilitate more effective patent examination.[460] Once issued, added disclosure assists decision-makers to understand the invention so that claims can be construed and the patentability standards can be effectively applied.[461] Further, information can benefit the relevant public so that it can "understand and improve upon the invention and to avoid the claimed boundaries of the patentee's exclusive rights."[462] To the extent that there is a more rigorous examination of design patents, more detailed disclosures will assist.

C. Consideration: Beyond the Visual

In its narrowest sense, the statute encompasses the structural contours of a design present in a line drawing. The current default rules place impediments against the submission of applications that feature non-traditional design. For example, aspects of the Equa chair design, including its responsiveness and flexibility, are not readily captured in the simple line drawings used in its design patent.[463] Some courts refer to design patent ornamentation as encompassing the visual.[464] Others use broader language, such as the design's aesthetic.[465] The latter suggests that a broader range of media is viable for protection.

As discussed throughout, design has evolved to include *visual plus* designs, which refer to multisensory characteristics that include at least one visual aspect. Unquestionably, the visual aspects of such designs qualify for design protection.[466] It is far less certain that the non-visual features, such as weight or the tactile feeling of the texture, could. This uncertainty exists despite any aesthetic, expressive, or communicative features that they possess in fact.[467] Visual plus designs appear to occupy a hybrid space. Although shape, color, and texture might be easily claimed, products

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459 Long, *supra* note 453, at 511; *see also id.* at 488 ("When the class of potential infringers is large and unwitting infringement is easy, rules that impose strict liability for infringement with no exceptions (as in patent law) impose information costs on individuals past the point of diminishing marginal returns.").

460 Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1345 (Fed. Cir. 2010).

461 *Id.*

462 *Id.*

463 U.S. Patent No. D289,120 (filed Feb. 17, 1984); *see supra* note 297, and accompanying text.

464 Spigen Korea Co. v. Ultraproof, Inc., 955 F.3d 1379, 1383 (Fed. Cir. 2020); High Point Design LLC v. Buyers Direct, Inc., 730 F.3d 1301, 1312 (Fed. Cir. 2013); Campbell Soup Co. v. Gamon Plus, Inc., 10 F.4th 1268, 1275 (Fed. Cir. 2021).

465 Auto. Body Parts Ass'n v. Ford Glob. Techs., LLC, 930 F.3d 1314, 1319 (Fed. Cir. 2019); Rains v. Cascade Indus., Inc., 402 F.2d 241, 247 (3d Cir. 1968) ("the design as a whole must produce a pleasing impression on the aesthetic sense18 of the ordinary observer."); Hupp v. Siroflex of Am., Inc., 122 F.3d 1456, 1461 (Fed. Cir. 1997); Carman Indus., Inc. v. Wahl, 724 F.2d 932, 939 (Fed. Cir. 1983) ("design patent protection concerns the ornamental or aesthetic features of a design"); Blumcraft of Pittsburgh v. United States, 372 F.2d 1014, 1017 (Ct. Cl. 1967).

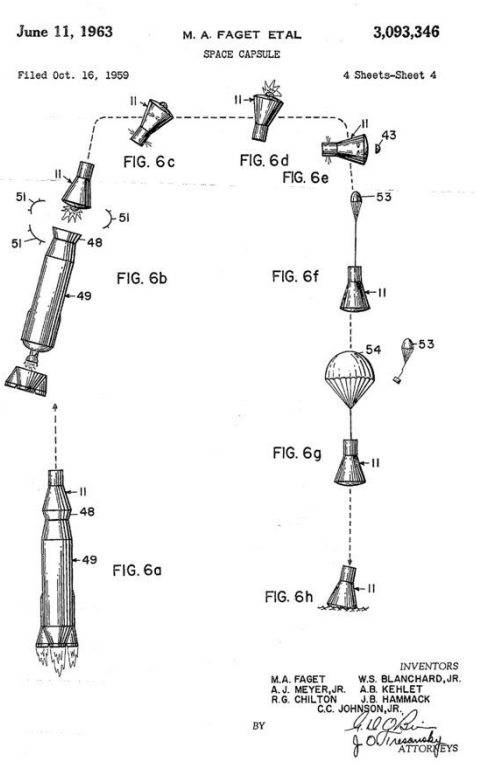
466 *See generally* MPEP § 1503.02; KeyStone Retaining Wall Sys., Inc. v. Westrock, Inc., 997 F.2d 1444, 1446 (Fed. Cir. 1993) (discussing infringement of a design patent for a building block that includes a "naturally textured" side).

467 NORMAN, *supra* note 267, at 69 (describing non-visual product attributes).

that rely on weight, hand feel, or luminosity to establish their points of novelty may be unable to do so.[468] Thus, designs that rely on non-visual aspects are in difficult territory. Given that current design practices are trending toward the multisensory, this system's conclusions should be revisited. Similarly, designs that rely entirely on non-visual aesthetics appear to be entirely left out of the design patent system. It is not clear whether this is a well-considered decision or one that has been impossible due to the PTO's figure rules.

At a minimum, protection of visual plus and non-visual design should be part of a conversation about the scope of protection. As discussed extensively herein, multisensory designs use aesthetic mechanisms to solve the types of problems that the patent system is positioned to reward. Design patents, when accompanied by robust enforcement of disclosure and claiming requirements, are ideally positioned to protect these types of inventions. Expanding the available formats and appearance of submissions for design patent applications can support multisensory forms of design by requiring a precise, legible definition of the claim and supporting information.

Conceivably, patent drawings capture the visual aspects of movement as demonstrated by this figure, below, excerpted from a utility patent.[469]



[468] For an example of products that uses cork, see DENT & SHERR, *supra* note 5, at 26–27.

[469] U.S. Patent No. 3,093,346 (filed Oct. 16, 1959).

This attempt at time-lapse representation demonstrates a general trajectory of the spacecraft's movement. However, these images alone cannot depict pace, although text or media that captures movement can. Aesthetic designs can integrate movement and interactivity in ways that impact the user's sensory experience. In the design patent space, allowing additional forms of media are far more capable of communicating the scope and operation of the design. Such media is more capable of illustrating a design's aesthetics in a manner that static drawings cannot. Such information can be incorporated by reference into a paper patent document using a link. Online, a hyperlink or QR code would be the most efficient method of displaying such information.

The forms of design representation have been relatively stable over the past century despite enormous shifts in design thinking. Law has formed a conception of the nature of design patent subject matter through rules and precedent that may not have considered the long-term effects of the design field's transition. At this juncture, designers have developed languages that are aimed at aesthetics that are readily understood by consumers. Yet the law has continued to force the capture of these designs in outdated modes. Updating the design system would serve the public notice function of the system, facilitate the application of the patentability standards in a consequential manner, and better align design law's framework with its purpose.

D. Address Technological Shortcomings

A patent's claims are critical to defining the scope of the right.[470] For design patents, this nearly always rests with the patent's drawings.[471] It might seem inconceivable that an IP system was created to protect a design in a manner that defers almost entirely to its drawings,[472] and then relies on a system that limits the patentee's ability to provide rich detail in the images because that system cannot cleanly reproduce them. Given the importance of design protection, the PTO should shift its processes to accommodate such detail in readily available forms. Certainly, the fragility of the system is apparent from the rejected Apple iPhone figure, a simple image that was deemed to be too complex to legibly reproduce.[473] The design system was created to parallel the utility patent system's procedural rules.[474] In an era of robust and flawless reproduction systems, some resources should be devoted to the design patent system to ensure that images and media are highly legible in their most easily available form. Further, certified paper copies of design patent images should be of the

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[470] Phillips v. AWH Corp., 415 F.3d 1303, 1312 (Fed. Cir. 2005) ("It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'")

[471] Egyptian Goddess, Inc. v. Swisa, Inc., 543 F.3d 665, 679 (Fed. Cir. 2008) ("the court has recognized that design patents 'typically are claimed as shown in drawings'").

[472] Arminak & Assocs. v. Saint-Gobain Calmar, Inc., 501 F.3d 1314, 1319 (Fed. Cir. 2007) ("Design patents typically are claimed as shown in drawings").

[473] See *supra* note 387 and accompanying text.

[474] Du Mont & Janis, *supra* note 73, at 1635.

highest quality.[475]

As previously discussed, the overall image quality for both issued electronic and paper versions of patents that issue from the agency should be improved across the entire PTO site and its certified copies. Undoubtedly, higher-quality images will further the public notice goal of the design system. Additionally, it would assist in the search for prior art, as well as allow for a more meaningful claim construction process. To the extent that technological problems are resolved, there is room to allow media that is more informative.

One additional issue relates to file uploads. Given the pressures of the first-to-file system which pushes patentees to file as early as possible, electronic submissions are the fastest method. Indeed, the PTO encourages patent applicants to use its electronic filing system (called EFS-Web) to electronically submit applications.[476] This requires a modified version of the Adobe PDF software as part of the process required to upload patent applications to the PTO.[477] The guidelines warn that color does not reproduce well using this format, and some colors can be rendered invisible.[478] Once received, the agency converts some files and stores others in the application's SCORE file.[479] The agency warns that the system may degrade the image quality.[480] Some informal evidence suggests that such degradation does occur for design patent applications.[481] Such shortcomings should be addressed to provide the cleanest reproduction possible.

VII. Conclusion

Deriving meaning from images is a difficult task. Their "inexpressible element that makes drawing valuable and irreplaceable: if everything could be converted into

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[475] See *supra* note 160, and accompanying text.

[476] U.S. Patent & Trademark Office, Filing Patent Applications Electronically During Designated Significant Outages of the United States Patent and Trademark Office Electronic Business Systems, 83 Fed. Reg. 44264 (Aug. 30, 2018) ("The United States Patent and Trademark Office (USPTO) encourages applicants to file their patent applications via its electronic filing system (EFS-Web)").

[477] U.S. Patent & Trademark Office, *PDF Guidelines for EFS-Web*, USPTO.GOV (Apr. 21, 2008), https://www.uspto.gov/sites/default/files/ebc/portal/efs/pdf-guidelines.pdf.

[478] *Id.* at 2 ("It is recommended that the text of the document be black. Text of other colors may not convert to image properly, resulting in unreadable or invisible text.").

[479] U.S. Patent & Trademark Office, Updated Legal Framework for Electronic Filing System—Web (EFS-Web), 84 Fed. Reg. 56803 (Oct. 23, 2019) (describing a mix of ASCII text documents, TIFF files, and color and grayscale drawings in PDF format as stored in SCORE); *see also Legal Framework for Patent Electronic System*, USPTO.GOV (Oct. 23, 2019), https://www.uspto.gov/sites/default/files/documents/2019LegalFrameworkPES.pdf.

[480] U.S. Patent & Trademark Office, Updated Legal Framework for Electronic Filing System—Web (EFS-Web), 84 Fed. Reg. 56803 (Oct. 23, 2019).

[481] Conversation with Tom Bassalino, BASS PATENT LAW (Aug. 17, 2021) (notes on file with author); Carl Oppedahl, *How to Get a Decent PDF of a US Design Patent That Is in Color Or Grayscale*, ANT LIKE PERSISTENCE BLOG (Nov. 9, 2019), https://blog.oppedahl.com/?p=5007 (discussing problems with color or grayscale drawings).

other forms of expression there would be no point in drawing."[482] Throughout the design process, considerable information is generated. When an applicant asks for protection, it is remarkable that the agency requests so little information in return. The images that are submitted could provide detail to assist decision-makers and the public to understand the patent, assess its validity, and create non-infringing designs. Where the image is central to the scope of the legal right, the quality of the image is paramount.

Richard Buchanan has explained that design's arc "is a history of the changing views of subject matter held by designers and the concrete objects conceived, planned and produced as expressions of those views."[483] The reductive images that are deemed acceptable to the PTO and the courts come from a long-ago time. They have constrained the legal system's understanding of the *potential* scope of design patent subject matter. The rules have flattened designs into images that depict structural edges and limited depictions of surface shading that are accepted—but not required—to be disclosed.

All else being equal, applicants choose the most reductive form possible that is acceptable. This results in broad claims for applicants in a manner that fails the public notice function. Images with the sparsest form of representation and the least amount of text have become acceptable to the patent system and patent applicants. This is true, even where the applicant possesses a rich source of information about the design. Such information would, if the disclosure requirements mean anything, benefit those in the field seeking to learn more about the design and the public more generally. Further, the design patent system should grapple with the forms that aesthetic design currently takes as it assesses updated methods to represent design.

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[482] Clive Ashwin, *Drawing, Design and Semiotics*, 1 DESIGN ISSUES 42, 42 (1984).

[483] Buchanan, *supra* note 9, at 19.