The Export-Import Dilemma: Inventions and Employment Abroad

Catherine Tornabene
Notes

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CATHERINE TORNABENE*

INTRODUCTION

In the mid-1980s, Congress extended patent law to address concerns that manufacturing and other commercial activities abroad circumvented United States patent protection.1 Traditionally, United States patent law did not have extraterritorial effect.2 But by the mid-1980s some worried that would-be infringers evaded liability and exported American jobs by performing patented processes and making patented apparatus abroad.3 This concern drove the passage of the Patent Law Amendments Act,
which added 35 U.S.C § 271(f) and a few years later, the Process Patent Amendments Act, which added 35 U.S.C. § 271(g).

Recently, the United States Court of Appeals for the Federal Circuit interpreted the breadth of these two statutes. The decisions are somewhat contradictory. While § 271(f) has been interpreted broadly, § 271(g) has been interpreted narrowly, an odd legal quandary in which companies are effectively rewarded by United States patent law for moving production abroad.

Examining the export and import of information products such as software demonstrates the unexpected effect of the Federal Circuit's §§ 271(f) and (g) jurisprudence. The inconsistent jurisprudence also affects traditional manufacturing products that are considered steps of a patented process. If such products are components of a patented invention, their export from the United States triggers infringement liability under § 271(f). However, the same products coming into the United States will not infringe under § 271(g), even if generated by a United States process patent.

Part I of this Note examines the history and original goals of 35 U.S.C. §§ 271(f) and (g). Part II examines recent divergent interpretations of both sections by the Federal Circuit. Part III discusses the effect the decisions may have on industry in the United States. Part IV examines suggested approaches to resolving the gap between the §§ 271(f) and (g) jurisprudence and how those approaches might affect the export of jobs from the United States.

I. THE HISTORY OF §§ 271(F) AND (G)

Both statutes were promoted as job-protection statutes and they were passed within a few years of each other. A discussion of the history of both statutes and their common goals follows.

A. THE PASSAGE OF § 271(F)

Section 271(f) passed in response to the Supreme Court's decision in Deepsouth Packing Co. v. Laitram Corp. Laitram held two patents that covered shrimp deveining devices. Deepsouth, which sought to avoid patent infringement liability in the United States, shipped pieces of the

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5. Id. § 271(g).
6. There is an ongoing dispute as to what it means to be a step of a patented process. See infra notes 105–117 and accompanying text.
8. Id. at 519–20. The two patents at issue in Deepsouth were combination patents, “warranted not by the novelty of their elements but by the novelty of the combination they represented.” Id. at 521.
machines abroad where they were assembled in less than an hour.\footnote{Id. at 523–24.} The assembled machines infringed Laitram’s patents, but Deepsouth maintained that the manufacture and export of the unassembled machines for final assembly abroad did not violate § 271 because both the “making” and the “use” of the infringing machines occurred abroad.\footnote{Id. Laitram sought an injunction against Deepsouth under § 271(a), id. at 527, which provided that “whoever without authority makes, uses, or sells any patented invention, within the United States during the term of the patent therefore [directly] infringes the patent,” id. at 522 (alteration in original) (internal quotation marks omitted) (quoting § 271(a)).} The Supreme Court, after observing that “[s]hrimp, whether boiled, broiled, barbecued or fried, are a gustatory delight, but they did not evolve to satisfy man’s palate,”\footnote{Id. at 528. Therefore, there is no direct infringement of the patent where the final “association” of the “separate elements” constituting the patented invention is “outside the territory for which the monopoly was granted.” Id. at 529 (internal quotation marks omitted) (quoting Radio Corp. of Am. v. Andrea, 79 F.2d 626, 628 (1935)).} found no infringement.\footnote{Id. at 531 (“In conclusion we note that what is at stake here is the right of American companies to compete with an American patent holder in foreign markets. Our patent system makes no claim to extraterritorial effect: ‘these acts of Congress do not, and were not intended to, operate beyond the limits of the United States,’ and we correspondingly reject the claims of others to such control over our markets.” (quoting Brown v. Duchesne, 60 U.S. 183, 195 (1856))).} The Court refused to grant extraterritorial rights to United States patent law\footnote{Id. at 532 (noting that the Court “would still insist on a clear congressional indication of intent to extend the patent privilege before [it] could recognize the monopoly here claimed”).} without a “clear congressional indication of intent” to do so, effectively issuing an invitation to Congress to address the issue.\footnote{Pub. L. No. 98-622, 98 Stat. 3383 (1984).}

Congress passed the Patent Law Amendments Act of 1984\footnote{SECTION-BY-SECTION ANALYSIS: PATENT LAW AMENDMENTS OF 1984, 130 CONG. REC. 28,065, 28,069, as reprinted in 1984 U.S.C.C.A.N. 5827, 5828 (“This proposal responds to the United States Supreme Court decision in [Deepsouth], concerning the need for a legislative solution to close a loophole in patent law.”) [hereinafter SECTION-BY-SECTION ANALYSIS].} in direct response to the Deepsouth decision.\footnote{Id. at 518–19.} The Congressional Record is not extensive, at least as compared to the § 271(g) record, but it does provide an indication of the goals of the legislation: to “avoid encouraging manufacturing outside the United States[, § 271(f)] will prevent copiers from avoiding U.S. patents by supplying components of a patented product in this country so that the assembly of the components may be
completed abroad.”

The final version of § 271(f) as proposed by the Patent Law Amendments Act contained two clauses. Both clauses addressed the export of “components of a patented invention” for combination abroad “in a manner that would infringe the patent if such combination occurred within the United States.” The clauses provided patentees two separate grounds for alleging infringement that could be used together or separately. Clause (1) was directed at those who supplied or caused to be supplied “all or a substantial portion of the components of a patented invention... in such manner as to actively induce the combination of such components outside of the United States.” Clause (2) was directed against those who supplied “any component of a patented invention that is especially made or especially adapted for use in the invention... knowing that such component is so made or adapted and intending that such component will be combined outside of the United States.”

When signing the bill into law, President Reagan emphasized that a strong patent system helped the United States stay at “the cutting edge of technology.” He explicitly endorsed Congress’s concern that potential infringers would both export jobs and avoid United States patent liability by shipping parts for final assembly abroad.

B. The Passage of § 271(g)

Four years after the enactment of § 271(f), Congress passed the Process Patent Amendments Act of 1988. Like § 271(f), § 271(g) passed

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17. Id.
19. The phrase “components of a patented invention” was not defined in the statute or in the legislative history, though the legislative history indicated that the phrases “actively induce” and “especially made or especially adapted for use in an infringement” in the new law were drawn directly from other clauses of 35 U.S.C. § 271. See Section-by-Section Analysis, supra note 16 (“The term ‘actively induce’ is drawn from existing subsection 271(b) of the patent law, which provides that whoever actively induces patent infringement is liable as an infringer... [E]specially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial non-infringing use’ comes from existing § 271(c) of the patent law.”).
20. Id. § 271(f).
23. Id. § 271(f)(2).
25. Id. (“[Section 271(f)] closes a loophole in existing law which permitted copyists to export jobs and avoid liability by arranging for final assembly of patent machines to occur offshore. The act eliminates unwarranted technicalities in the patent law that threaten the validity of patent for inventions arising from corporate research teams.”).
in response to concerns about loopholes in U.S. patent law detrimental to American industry and jobs in the face of foreign competition, but unlike § 271(f), the legislative history is extensive. Congress considered several proposals for patent law reform before the Process Patent Amendments Act was finally passed in 1988.

When it was finally enacted, § 271(g) was designed to complement 19 U.S.C. § 1337, which provided remedies from the International Trade Commission against "unfair methods of competition." Section 271(g) established infringement liability against "[w]hoever without authority imports into the United States or offers to sell, sells, or uses within the United States a product which is made by a process patented in the United States.

The new statute contained two important exceptions to the general infringement liability it established: "A product which is made by a patented process will, for purposes of this title, not be considered to be so made after[] (1) it is materially changed by subsequent processes; or (2) it becomes a trivial and nonessential component of another product."

C. THE SHARED GOALS OF §§ 271(F) AND (G)

Though different in the infringement liability they established, both §§ 271(f) and (g) shared the goal of protecting American jobs and industry from foreign competition. The Federal Circuit noted that "[t]ogether, the two new statutory acts of infringement were intended to

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27. See, e.g., S. Rep. 100-83, at 29 (1987) ("As compared with those of our major trading partners, the inadequate protection contained in U.S. process patent law has emerged as a major factor in the dynamics of global innovation and economic competition.").


30. 19 U.S.C. § 1337 (2000). Methods of competition unfair to United States businesses included importing articles “made, produced, processed, or mined under, or by means of” a United States process patent. Id. § 1337(a)(1)(B)(ii). Congress observed in debating § 271(g) that an unfair method of competition under 19 U.S.C. § 1337 was the importation into the United States, the sale for importation, or sale within the United States after importation by the owner, importer, or consignee, of articles that... are made, produced, processed, or mined under, or by means of, a process covered by the claims of a valid and enforceable United States patent.


32. Id. As with § 271(f), key phrases such as “component” or “materially changed” were not solidly defined in the legislative history.
avoid encouraging manufacturing outside the United States.” The legislative histories of both indicate an abiding concern with foreign infringers who, according to Justice Blackmun in his *Deepsouth* dissent, “reap the fruits of American economy—technology, labor, materials, etc.—but [who are not] subject to the responsibilities of the American patent laws.”

The idea of revisiting the concept of patent law territoriality was discussed for some time before §§ 271(f) and (g) passed. The proposal to protect against extraterritorial use of process patents, which eventually became § 271(g), was first suggested in the 1966 Report of the President’s Commission on the Patent System as part of a general initiative to improve American competitiveness. After the *Deepsouth* decision triggered pressure for patent protection covering infringing inventions manufactured abroad, reform that eventually became § 271(f) was also proposed.

In 1983, in one of a series of proposed patent law reform bills, the two statutes were proposed and discussed together. The first part of that proposed bill was a precursor to § 271(g) but was eventually dropped from the final bill due to debate about the scope of the proposed statute. The second part, however, passed, and after some modifications eventually became § 271(f).

Both proposed statutes were promoted as domestic job protection bills. One sponsor of a 1985 version of § 271(g) argued that “establishing effective, international protection of intellectual property... should be a critical component of our trade policy [and a] critical component of our efforts to maintain industrial competitiveness.” He described his bill as “a jobs bill.” The 1984 combined bill, which included versions of §§ 271(f) and (g), was proposed “to avoid encouraging manufacturing outside the United States.” After § 271(f) passed, the precursors to

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34. Deepsouth Packing Co., Inc. v. Laitram Corp., 406 U.S. 518, 534 (1972) (Blackmun, J., dissenting) (quoting Laitram Corp. v. Deepsouth Packing Co., Inc., 443 F.2d 936, 939 (5th Cir. 1971)).
35. See President’s Comm’n on the Patent Sys., supra note 29, at 35–36.
36. Id.
37. Bayer AG, 340 F.3d at 1374.
38. Id. at 1374 n.10 (citing 130 Cong. Rec. 31,834 (statement of Sen. Mathias)).
39. Id.
40. 131 Cong. Rec. 21,738 (1985) (statement of Sen. Lautenberg). Sen. Lautenberg quoted a report of the International Trade Commission on American jobs lost due to infringement of intellectual property. Id. at 21,739 (“The International Trade Commission estimated, back in 1982, that infringement of U.S. intellectual property cost Americans 131,000 jobs in just 5 selected industrial sectors, and cost the Nation’s businesses $5.5 billion in annual sales. Since then, it is widely believed, the problem has gotten worse.”).
41. Id.
§ 271(g) continued to be discussed in reference to jobs and industry within the United States. The 1985 Report of the President’s Commission on Industrial Competitiveness, which concluded that “[t]he United States is losing its ability to compete in world markets,” recommended protecting the imported products of process patents as a means of protecting American competitiveness.

II. DIVERGENT INTERPRETATIONS OF THE STATUTES

While the original goals of both statutes were similar, the Federal Circuit’s jurisprudence on each has yielded different results as to the reach of each statute. Section 271(f) now supports broad extraterritorial infringement liability but § 271(g) is narrower in scope. The key cases in this area are discussed in this Part.

The initial § 271(f) cases heard before the Federal Circuit appeared to limit the reach of § 271(f) to manufactured products covered by United States product patents. In one of the earliest § 271(f) cases, Standard Havens Products, Inc. v. Gencor Industries, the Federal Circuit suggested that § 271(f) did not apply to process patents, though it did not provide any further analysis. A 2001 case established that § 271(f)(2) did not require physical assembly of the infringing components into the final patented invention, just that they be shipped abroad with that intention. However, in 2004 the Federal Circuit emphasized the physical nature of exported § 271(f) components in Pellegrini v. Analog Devices, Inc. That case appeared to effectively restrict the applicability of § 271(f) to patents on machines or other physical devices. Other lower court decisions had also refused to extend § 271(f) to process patents, believing that process patents lacked the “components of a patented invention” necessary for infringing assembly abroad.

44. 2 President’s Comm’n on Indus. Competitiveness, supra note 43, at 317 (1985).
45. See 953 F.2d 1360, 1374 (Fed. Cir. 1991) (“[W]e do not find the provisions of [§ 271(f)] implicated.”). The patent at issue covered a process for producing asphalt, but not the apparatus for implementing the process. Id. The alleged infringer had sold a machine which performed the process to a foreign customer. Id. The machine was not sold to customers in the United States or used in the United States, either of which would have triggered infringement liability under § 271(a).
46. Waymark Corp. v. Porta Sys. Corp., 245 F.3d 1364, 1368 (Fed. Cir. 2001). Waymark Corp. was the exclusive licensee to a method and corresponding system for testing the capacity of batteries. Id. at 1365. Porta Systems shipped components of an infringing system to Mexico with the intention that they be assembled there, but the final systems were never assembled. Id. The Federal Circuit found possible liability under § 271(f)(2), noting that “[a]t no point does the statutory language require or suggest that the infringer must actually combine or assemble the components. A party can intend that a shipped component will ultimately be included in an assembled product even if the combination never occurs.” Id. at 1368. The patent at issue in that case was directed to an apparatus. Id.
47. 375 F.3d 1113, 1117–18 (Fed. Cir. 2004).
48. Id. at 1118.
The initial Federal Circuit decisions on § 271(g) similarly limited the extraterritorial reach of the statute. In 1996, the Federal Circuit examined the two exceptions to § 271(g) in *Eli Lilly & Co. v. American Cyanamid Co.* Eli Lilly owned a patent that recited a process for making an intermediate drug compound used in the production of a broad-spectrum antibiotic. The intermediate compound underwent four subsequent steps before it was converted into the final antibiotic product, which was not covered by the patent. Eli Lilly had sought a preliminary injunction against the importation and sale of the generic antibiotic in the United States, arguing that the drug infringed its patent on the intermediate process and therefore triggered § 27(g) process patent protection. Eli Lilly proposed that the Federal Circuit establish a standard that a product of a patented process would not be considered materially changed under § 271(g) if the “principal commercial use of that product [lay] in its conversion into the product that [was] the subject of the infringement charge.” In other words, Eli Lilly proposed that infringement under § 271(g) should look directly to the use of the disputed product after it was imported into the American market.

The Federal Circuit rejected this reasoning, although the court was sympathetic to the policy argument that reading the “materially changed” language of § 271(g) too strictly would subvert Congress’s desire to protect American process patent holders in passing the statute. Judge Rader concurred with the result but disagreed with the analysis of the “materially changed” language of § 271(g), suggesting that “[r]ather than attempting to distill an elixir from this intoxicating witches brew of enactment history, this court should interpret ‘material change’ consistent with the overriding purpose of the Act—to provide protection to process patent holders.”

The 2003 *Bayer AG v. Housey Pharmaceuticals, Inc.* decision in the

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50. 82 F.3d 1568 (Fed. Cir. 1996).
51. Id. at 1570.
52. Id.
53. Id. at 1571–72.
54. Id. at 1572.
55. Id. (“Although we are not prepared to embrace Lilly’s argument, we acknowledge that it has considerable appeal. Congress was concerned with the problem of overseas use of patented processes followed by the importation of the products of those processes, and a grudging construction of the statute could significantly limit the statute’s effectiveness in addressing the problem Congress targeted. That is especially true with respect to chemical products, as to which simple, routine reactions can often produce dramatic changes in the products’ structure and properties.”). The court noted that the legislative history was “not easy to interpret, in part because it purports to identify some products that can be ‘materially changed’ without being ‘materially changed.’” Id. at 1575. The court expressed concern that the effect of Eli Lilly’s proposed reading of § 271(g) “would be sweeping. Absent clearer congressional direction, we decline to adopt so broad a principle.” Id. at 1576.
56. Id. at 1581 (Rader, J., concurring).
Federal Circuit is the most recent and most definitive statement as to the breadth of § 271(g). 57 Housey owned method patents which disclosed processes used to test substances ("agents") for their activating or inhibiting effect on protein activity in cells. 58 Bayer used those patented processes outside of the United States to characterize pharmacologically active agents. 59 The gathered information regarding the agents was then sent back to the United States for use in making drugs in the United States. 60 Bayer also imported "a pharmaceutical composition identified by the patented process . . . ." 61 The disputed § 271(g) issue was "the meaning of the phrase 'a product which is made by a [patented] process.'" 62 Housey contended that importing information obtained by performing its patented process violated § 271(g) because the imported information was "a product made by a patented process." 63

The Federal Circuit rejected this interpretation of the reach of § 271(g). 64 The court determined that the phrase "made by a patented process" should be interpreted as "manufactured by a patented process" because "Congress did not intend to expand coverage [of infringement liability under § 271(g)] beyond manufactured articles." 65 Therefore the statute "[a]pplied only to physical goods and that information is not included." 66 The court extensively analyzed the legislative history of § 271(g), and while it noted Congress's "concern over competition between domestic and foreign manufacturers," it concluded that Congress was focused primarily on the manufacturers of "tangible products and not mere information." 67

While the Federal Circuit limited the protection of products made by patented processes abroad under § 271(g), the 2005 Eolas Technologies, Inc. v. Microsoft Corp. decision broadened the extraterritorial reach of § 271(f). 68 Under § 271(g), products produced by patented processes abroad and imported into the United States infringed only if those processes produced "tangible" goods that were not materially changed. 69 However, after Eolas and the subsequent § 271(f) cases, nearly any product or item, tangible or not, that is considered part

57. 340 F.3d 1367, 1369 (Fed. Cir. 2003).
58. Id.
59. Id.
60. Id. at 1370.
61. Id.
62. Id. at 1371.
63. Id. ("[T]he information . . . claimed in the Housey patents is itself a product made by a patented process.").
64. Id. at 1377.
65. Id. at 1372, 1376 ("[T]he statute clearly contemplates that 'made' means 'manufactured.'").
66. Id. at 1371.
67. Id. at 1376.
68. 399 F.3d 1325 (Fed. Cir. 2005).
69. See supra notes 57-67 and accompanying text.
of any patented invention, including process patent inventions, will infringe if exported for combination abroad.

Eolas sued Microsoft for patent infringement in 1999. Eolas claimed that elements of Microsoft’s Internet Explorer web browser infringed its patent, which the inventors asserted was the first instance of interactive applications embedded in web pages.

In the course of doing business abroad, Microsoft exported a small number of “golden master disks” which contained the software code for Windows. These master disks were sent to independent computer manufacturers who replicated the code on the disks to computer hard drives which were then incorporated into computers offered for sale outside the United States. The original golden master disk containing the Windows software code was never a physical part of an infringing product, but Eolas sought royalty damages under § 271(f).

At trial, a jury found infringement on the part of Microsoft and awarded Eolas a royalty that included foreign sales of the infringing computer code under § 271(f). On appeal, the Federal Circuit, in a panel opinion authored by Judge Rader, described the § 271(f) issue as centering around whether software made in the United States and exported abroad was a “component[] of a patented invention” for the purposes of § 271(f).

The court looked for the meaning of the phrase “components of a patented invention” in the definitions section of Title 35. The court

70. Eolas, 399 F.3d at 1328.
71. Id. There were two claims at issue on appeal, a method and a product claim. Id. at 1330. The patentee asserted that the product claim embodied the method claim. Id.
72. Id. at 1328-29. The preferred embodiment of the patent suggested one example of such embedded interactive applications: “an image viewer that processes and displays 3D images... and allows the user to manipulate the images” in the browser window. Eolas Techs., Inc. v. Microsoft Corp., No. 99 C 0626, 2000 U.S. Dist. LEXIS 18886, at *8 (N.D. Ill. Dec. 28, 2000).
73. Id.
74. Id.
75. Id. In the trial court Eolas had sought royalty damages for both foreign and domestic sales of the Windows operating system. Id. at 1331. In response, Microsoft moved in limine to prevent Eolas from seeking damages based on foreign sales under § 271(f). Id. The district court denied Microsoft’s motion, finding that “source code is the legal equivalent of a piece of computer hardware and that ‘in a legal sense, a [sic] source code is made part of a computer product.’” Id. at 1331-32. Therefore, “the code on the golden master disks constitutes ‘components’ of an infringing product for combination outside the United States under § 271(f).” Id. at 1332. Microsoft had appealed the trial court’s denial of the in limine motion.
76. The royalty was $1.47 per unit of infringing product. Id.
77. Id.
78. Id. at 1338 (alteration in original).
79. Id. (quoting 35 U.S.C. § 271(f) (2000)); see also id. ("Title 35, in the definitions section, defined ‘invention’ to mean ‘invention or discovery’—again broad and inclusive terminology.")
noted that software code alone qualifies as a patentable invention. Therefore, the code described in Eolas's patent fit under the "broad statutory label of 'patented invention.'"

The court explicitly rejected Microsoft's argument that Pellegrini imposed a "tangibility" requirement on § 271(f) components, effectively limiting the reach of § 271(f) to physical, manufactured articles like the shrimp deveining machines in Deepsouth. The court noted that Pellegrini did not address the meaning of the "components" language of § 271(f). Pellegrini "require[d] only that components are physically supplied from the United States" and that decision did "not impose on § 271(f) a tangibility requirement that does not appear anywhere in the language of that section." Eolas therefore established that § 271(f) liability extended to intangible components of patented inventions exported for assembly abroad unlike its earlier finding limiting § 271(g) liability to the tangible products of process patents in Bayer v. Housey.

Shortly after Eolas was decided, Microsoft again argued before a Federal Circuit panel that exported software could not be considered a component of a patented invention under § 271(f) in AT&T Corp. v. Microsoft Corp. The panel, however, regarded that issue as settled by Eolas. The panel addressed the issue of how software components could be supplied for the purposes of § 271(f), since it had already been

(quotiting 35 U.S.C. § 100(a)); id. at 1338-39 ("Title 35, § 101, explains that an invention includes 'any new and useful process, machine, manufacture or composition of matter.'" (quoting 35 U.S.C. § 101)).

80. Id. (citing In re Alappat, 33 F.3d 1526 (Fed. Cir. 1994)); AT&T Corp. v. Excel Commc'ns, Inc., 172 F.3d 1352 (Fed. Cir. 1999); UNITED STATES PATENT AND TRADEMARK OFFICE, U.S. DEP'T OF COMMERCE, MANUAL OF PATENT EXAMINING PROCEDURE § 2106(IV)(B)(1)(a) (8th ed., 2d rev. 2001) ("[35 U.S.C. § 101] . . . explains that an invention includes 'any new and useful process, machine, manufacture or composition of matter.' Without question, software code alone qualifies as an invention eligible for patenting under these categories, at least as processes. The patented invention in this case is such a software product. Thus, this software code claimed in conjunction with a physical structure, such as a disk, fits within at least those two categories of subject matter within the broad statutory label of 'patented invention.'" (internal citations omitted)).

81. Id. at 1339.
82. See supra note 47-48 and accompanying text.
83. Eolas, 399 F.3d at 1340.
84. Id. at 1341.
85. Id.
86. 414 F.3d 1366, 1368 (Fed. Cir. 2005).
87. The case was heard by Judges Mayer, Lourie, and Rader, and the opinion was written by Judge Lourie. Id. at 1367.
88. Id. at 1369. Microsoft had also argued that the software (as a series of machine instructions itself) was analogous to the exported instructions in Pellegrini, but the panel distinguished Pellegrini. Id. at 1370. The Windows software itself was a component under § 271(f); the Pellegrini analogy would have instead been instructions sent by Microsoft to foreign software engineers to write code for Windows. Id. ("[W]hat is being supplied abroad is an actual component, i.e., the Windows operating system, that is ready for installation on a computer to form an infringing apparatus—not instructions to foreign software engineers for designing and coding Windows. Thus, Pellegrini does not control this case.").
established that software could be a component for § 271(f).\footnote{Id. at 1370.}

AT&T alleged that Microsoft's Windows product infringed its patent on speech "codecs," which are software programs that encode and decode speech signals for compression and later decompression.\footnote{Id. at 1368.} As in the\textit{Eolas} case, Microsoft sent a small number of master versions of Windows abroad to manufacturers and authorized those manufacturers to replicate the masters for installation on machines which were then sold to foreign customers.\footnote{Id.} The exported master disks allegedly incorporated the infringing codecs.\footnote{Id.}

The legal issue on appeal\footnote{Id. at 1370.} was "whether software replicated abroad from a master version exported from the United States—with the intent that it be replicated—may be deemed 'supplied' from the United States for the purposes of § 271(f)."\footnote{Id. at 1368.} Microsoft had argued that a foreign-replicated copy made from a master version from the United States did not qualify for damages under § 271(f) because those foreign-replicated copies of Windows were not "supplie[d] or cause[d] to be supplied in or from the United States," but the court rejected this reasoning.\footnote{Id.}

The\textit{AT&T} panel noted it would be "unsound to construe a statutory provision that was originally enacted to encourage advances in technology by closing a loophole, in a manner that allows the very advances in technology thus encouraged to subvert that intent"\footnote{Id. at 1369.} and examined the "realities of software distribution."\footnote{Id. at 1371.} Foreign copying in such an environment could be considered "supplying," as the goal was not to focus on how the export of infringing components occurred, but instead that they were exported.\footnote{Id. at 1370.} While the panel discussed upholding

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\item \footnote{Id. at 1369.} During the lower court trial, Microsoft moved in limine to exclude evidence of possible liability under § 271(f).\textit{Id.} ("In support of its motion, Microsoft argued that: (1) software is intangible information such that it could not be a 'component' of a patented invention within the meaning of § 271(f); and (2) even if the Windows software were a 'component,' no actual 'components' had been 'supplied' from the United States as required by § 271(f) because the copies of Windows installed on the foreign-assembled computers had all been made abroad."). The in limine motion was converted into a motion for partial summary judgment of noninfringement under § 271(f), which the district court denied.\textit{Id.} The district court held that § 271(f) did not limit "components" to tangible structures and therefore software could be a "component" of a patented invention.\textit{Id.} Furthermore, the district court ruled that copies that were made abroad from a golden master disk were covered by § 271(f) given that the purpose of the statute was to prevent circumvention of infringement by exportation.\textit{Id.} The § 271(f) issue was expressly appealed to the Federal Circuit.\textit{Id.} \footnote{Id. at 1370-71.} ([F]or software components, the act of copying is subsumed in the act of 'supplying,' such that sending a single copy abroad with the intent that it be replicated invokes § 271(f)\end{itemize}
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the legislative purpose of § 271(f), it dismissed Microsoft's contention that expanding the reach of § 271(f) in this manner would damage the domestic software industry:

Microsoft’s impassioned recitation of a parade of horribles that may befall the domestic software industry—such as the relocation of manufacturing facilities overseas—provides an insufficient basis for reaching a different result in this case. After all, the enactment of § 271(f) could have been similarly thought to result in the export of jobs, and Congress still enacted that provision. Moreover, possible loss of jobs in this country is not justification for misinterpreting a statute to permit patent infringement.

The extent of patent infringement liability attaching to exported components of patented inventions was broadened yet again when the Federal Circuit found that every component of every form of invention is covered by § 271(f). In Eolas, the question had been whether software could be a component, but in Union Carbide, the question was whether a physical composition that represented one step of a process patent could be a component. Finding that § 271(f) applied to process patents, the Federal Circuit declined to address the controversy en banc, over the objections of Judge Lourie.

Union Carbide's patent recited a more efficient process for producing the gas ethylene oxide. Ethylene oxide is a chemical intermediate gas used primarily in the production of ethylene glycol. Ethylene glycol has multiple forms, but it is most frequently (and profitably) used as monoethylene glycol. Ethylene glycol, usually in the form of monoethylene glycol, is subsequently used in the production of polyester fiber, resins, antifreeze, aircraft de-icing fluid, and polyester film.

liability for those foreign-made copies. Liability under § 271(f) does not depend on the medium used for exportation. Liability under § 271(f) is not premised on the mode of exportation, but rather the fact of exportation.

99. Id. at 1372.
100. Id.
102. See supra note 3 for a discussion of the difference between process patents and product patents.
103. Union Carbide, 425 F.3d at 1379.
104. Id. at 1378.
106. Union Carbide, 425 F.3d at 1370. The patented process produced ethylene oxide with a greater decrease in reaction temperature than prior processes. Id.
108. Id.
Prior art methods of producing ethylene oxide had used pure silver catalysts, but Union Carbide's patent taught that silver catalysts which included other alkali metals were more efficient. Shell Oil exported these (infringing) catalysts to its foreign affiliates for use in the production of ethylene oxide abroad using the patented process.

The original damages award did not account for Shell Oil's exportation of the infringing catalysts because the district court had ruled in limine that § 271(f) "is not directed to process claims." The Federal Circuit panel reversed this holding. Judge Rader, writing for the panel, observed that once again the breadth of §271(f) was up for interpretation:

In other words, does [the phrase "components of a patented invention"] apply to components used in the performance of patented process/method inventions? [Eolas] recently answered this question in the affirmative, holding that every component of every form of invention deserves the protection of [§ 271(f)]; i.e., that "components" and "patented inventions" under § 271(f) are not limited to physical machines.

In finding that § 271(f) covers process claims, the panel endorsed the approach of the Eolas court, writing, "[t]hus, as Eolas explained, the statute makes no distinction between patentable method/process inventions and other forms of patentable inventions." Judge Rader found the facts of Eolas and the facts of Union Carbide complementary, finding Microsoft's exported code analogous to Shell Oil's exported catalyst.

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111. Union Carbide, 425 F.3d at 1370. Union Carbide's improved process reduced the formation of oxygen and water byproducts and also increased the efficiency of the chemical reaction. Id. The only claim at issue on appeal concerned a process which involved a catalyst using silver, cesium and lithium. Id.

112. Id. at 1380.

113. Id. at 1378. The district court had prohibited Union Carbide from submitting evidence of Shell Oil's sales abroad for the purposes of recovering damages under § 271(f)(2). Id.

114. Id.

115. Id. at 1378-79.

116. Id. at 1379.

117. Id. ("Moreover, Eolas and this case featured similar facts. In Eolas, Microsoft exported a master computer disc with program code that caused a computer to perform various method steps.... Thus, both this case and Eolas feature the exportation of a component (i.e., a computer disc with program code in Eolas and a catalyst in this case) used in the performance of a patented process or method (i.e., the method steps executed by the computer in response to the computer readable program code in Eolas and the commercial production of [ethylene oxide] in this case). In that setting, Eolas applied § 271(f) to Microsoft's exported component. Similarly, § 271(f) applies to Shell's exportation of catalysts (i.e., a 'component') used in the commercial production of [ethylene oxide] abroad (i.e., a 'patented invention').")
III. DEFINING THE CURRENT EXTRATERRITORIAL REACH OF U.S. PATENT LAW

The original protectionist goal of both statutes is implicated by these somewhat contradictory lines of cases. Taken together, the Eolas, AT&T, and Union Carbide decisions support broad liability under § 271(f) for exported products: any item, distributed in any form, that could be considered a component of any patented invention, including those inventions described by process patents, may trigger liability. This not only expands extraterritorial reach of United States patent law, it offers an incentive to companies who think they may infringe an American patent to move their entire production offshore. In contrast, liability under § 271(g) has been rather strictly defined and as a result the products of process patents practiced abroad may be imported into the United States if those products fit into the § 271(g) exceptions. Traditional manufacturing products that are created by practicing United States process patents abroad will still infringe under § 271(g). However, the “materially changed” exception is available to importers, as in the Eli Lilly case, and § 271(g) as a whole is limited to what the Bayer court described as “tangible” manufactured products.

The wide gulf between liability that attaches to items leaving the United States and those returning to the United States defies Congress’s purpose in enacting the statutes. While the original laws were intended to retain jobs in the United States, under the current interpretations potential infringers may escape liability by moving their entire production abroad rather than keeping some production in the United States, presuming the patent holder has no foreign patent protection.

A. CHANGING UNION CARBIDE

Altering the facts of the Union Carbide case demonstrates the tension between the Federal Circuit’s §§ 271(f) and (g) jurisprudence and the original protectionist goals of both statutes. Assume that Shell Oil,


119. See supra notes 50–56 and accompanying text.

120. Bayer AG v. Housey Pharm., Inc., 340 F.3d 1367, 1374–75 (Fed. Cir. 2003) (“[N]othing in the legislative history [suggests] that Congress was concerned that the preexisting statutory scheme failed to reach intangible information . . . . A 1987 Senate report on substantially identical legislation also supports limiting the statute to manufactured tangible products . . . . [T]here is no indication of any intent to reach products other than tangible products produced by manufacturing processes.”).

121. A failure to obtain foreign patents has traditionally been held against the American patent holder. See, e.g., Deep South Packing Co. v. Laitram Corp., 406 U.S. 518, 531 (1972); Pellegrini v. Analog Devices, Inc., 375 F.3d 1113, 1119 (Fed. Cir. 2004). The World Trade Organization maintains minimum standards for protection of intellectual property, including patents, that must be supported by all member states. See generally Daniel Gervais, The TRIPS Agreement: Drafting History and Analysis (2d ed. 2003).

122. See supra notes 101–117 and accompanying text.
when it decided to enter the business of ethylene oxide production, realized that exporting the catalysts used in the patented process would trigger § 271(f) liability. In this alternate scenario, Shell Oil still wishes to produce ethylene oxide using its patented method and sell it to foreign affiliates even though exporting the catalysts infringes under § 271(f). Therefore, in an effort to avoid § 271(f) liability, Shell Oil moves its entire production of ethylene oxide abroad.\textsuperscript{123}

Shell Oil produces ethylene oxide using the patented process in its entirety at a foreign location which is, as in the original case, converted into ethylene glycol and subsequently into various products.\textsuperscript{124} Both the ethylene glycol and the subsequent products are sold abroad and imported back into the United States for sale.\textsuperscript{125}

The product of the original process goes through conversions similar to the intermediate compound in \textit{Eli Lilly & Co. v. American Cyanamid, Inc.}\textsuperscript{126} There is room for debate as to whether the conversion of ethylene oxide into ethylene glycol would be considered material.\textsuperscript{127} However, even if there is debate as to whether the conversion from ethylene oxide into ethylene glycol is a material change, the subsequent conversion of ethylene glycol into assorted products such as antifreeze and polyester fiber would almost certainly be material under the \textit{Eli Lilly} standard.\textsuperscript{128}

In order to avoid liability under the Federal Circuit's recent interpretation of § 271(f), Shell Oil must export its entire production of

\textsuperscript{123} This example is not far-fetched. In the 1990s, the United States was a net exporter of ethylene glycol, but it is predicted that by 2010 it will be a net importer. See \textit{The Innovation Group}, \textit{supra} note 109.

\textsuperscript{124} The ethylene glycol in this example, as in the \textit{Union Carbide} case, would be converted into resins, films, antifreeze, polyester fibers, and other products. See \textit{supra} notes 107–109 and accompanying text.

\textsuperscript{125} As established in the real \textit{Union Carbide} case, ethylene oxide is a chemical intermediate product. See \textit{supra} note 107 and accompanying text. It must be converted into ethylene glycol to be of any use, and the ethylene glycol is later converted to various products. \textit{Id.}

\textsuperscript{126} See \textit{supra} note 51 and accompanying text. In the \textit{Eli Lilly} case, the chemical properties of the intermediate compound and the final antibiotic in \textit{Eli Lilly} "[were] completely different, the 'basic utility' of the products [was] different, and the chemical structure of the two products [was] significantly different. The changes between [the two compounds went] far beyond . . . minor changes." \textit{Eli Lilly & Co. v. Am. Cyanamid, Inc.}, 82 F.3d 1568, 1577 (Fed. Cir. 1996).

\textsuperscript{127} As the structure of the chemical is changed, the conversion is probably material under \textit{Eli Lilly}. The Federal Circuit quoted a Senate Committee report indicating that not all chemical conversions would be considered material: "Usually a change in the physical form of a product (e.g., the granules to powder, solid to liquid) or minor chemical conversion, (e.g., conversion to a salt, base, acid, hydrate, ester, or addition or removal of a protection group) would not be a 'material' change." \textit{Eli Lilly}, 82 F.3d at 1577 (quoting \textit{S. Rep. No. 100-83}, at 49 (1987)). Furthermore, like the unpatented final product in \textit{Eli Lilly}, \textit{Id.} at 1575, ethylene glycol can be made by methods other than using the patented process, \textit{Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co.}, 425 F.3d 1366, 1370 (Fed. Cir. 2005) (describing the methods used to make ethylene oxide before the claimed method was developed).

\textsuperscript{128} \textit{Eli Lilly}, 82 F.3d at 1577. The utility, chemical composition, and physical structure of the resulting products are completely different than that of the original ethylene oxide.
ethylene oxide abroad rather than keep some chemical manufacturing in the United States as was done in the original case. Once production is abroad, the company could issue instructions from the United States governing the production of ethylene oxide using the patented process without triggering infringement liability.\(^2\) As a result of the _Eli Lilly_ decision, Shell Oil could then import the resulting ethylene glycol (and certainly the converted final products) without fear of triggering § 271(g) liability.

This imagined scenario demonstrates how the recent statutory interpretation of §§ 271(f) and (g) is at odds with Congress's original motivation behind both sections, keeping manufacturing in the United States.\(^3\) Shell Oil would be effectively rewarded for moving its entire production of ethylene oxide abroad. In the real case, it was penalized for making the catalysts of the original process in the United States for use abroad.

**B. THE TANGIBLE PRODUCTS PROBLEM AND THE INFORMATION ECONOMY**

Examining the type of product that has twice triggered § 271(f) liability at the Federal Circuit for Microsoft—software and other information products—demonstrates the distance between the original protectionist goals of both statutes and the resulting jurisprudence.\(^1\) The _Bayer_ court considered information "intangible" and therefore ineligible for import protection under § 271(g).\(^2\) On the other hand, the _Eolas_ and _AT&T_ courts found liability for exported software, arguably another form of information,\(^3\) under § 271(f).\(^4\)

Information, including software, is an easily exported and imported commodity. The United States is a major exporter of software, significantly more so now than when §§ 271(f) and (g) were enacted.\(^5\) It does not require extensive shipping arrangements; as seen in both _AT&T_ and _Eolas_, valuable software can be shipped abroad on a single disk, the

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129. See supra note 88.
130. See supra Part I.
131. See supra notes 68–100 and accompanying text.
132. See supra notes 64–67 and accompanying text.
133. See Andrew F. Knight, _Software, Components, and Bad Logic: Recent Interpretations of Section 271(f),_ 87 J. PAT. & TRADEMARK OFF. SOC'Y 493, 493–94 (2005) (positing that software, as a set of instructions to the machine, cannot be considered a component though it is information). The issue of whether software is a component under § 271(f) is still very much disputed: Microsoft petitioned the Supreme Court for certiorari specifically on the question of "[w]hether digital software code—an intangible sequence of 'i's' and 'o's'—may be considered a 'component' of a patented invention' within the meaning of Section 271(f)(1) . . . ." Petition for Writ of Certiorari, AT&T Corp. v. Microsoft Corp., 126 S. Ct. 1901 (2006) (No. 05-1056).
134. See supra note 131.
golden master disk, or transmitted electronically. It can be transmitted instantaneously, with very little expense.

Software development does not need to be tied to a single geographic location. There are many major software companies headquartered in the United States that do significant software development abroad. The software developed in locations such as Ireland, India, and China is both sold abroad and imported back into the United States.

The information economy is not limited to software, of course. One analyst noted that businesses are increasingly interested in “knowledge processing” abroad as they seek to reduce the cost of high-end services that rely on the intellectual skills of educated employees. By 2010, knowledge-process outsourcing in India is expected to be a $17 billion business, compared with about $5 billion in 2003. For example, analysts and researchers in foreign countries now provide extensive stock research and analysis for U.S. investment banks, hedge funds, and other financial institutions. Even traditionally local jobs such as teaching are not entirely immune from competition abroad.

Recent Federal Circuit cases impact this complex and constantly shifting economy. Under the §271(f) line of decisions, software companies exporting software that could be considered a component of a patented invention (in AT&T this was a few lines of software out of millions) could be liable for infringement regardless of the method of distribution. However, sending instructions abroad to write infringing software or perform patented processes would not infringe under §271(f) as set forth in Pellegrini.

One argument against the idea that broadly interpreting §271(f) encourages off-shoring of American jobs is that the U.S. market is too big and valuable a market for manufacturers of software and other

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136. See AT&T Corp. v. Microsoft Corp., 414 F.3d 1366, 1368 (Fed. Cir. 2005); Eolas Techs., Inc. v. Microsoft Corp., 399 F.3d 1325, 1331 (Fed. Cir. 2005).


138. See McCarthy, supra note 135, at 815.

139. See John D. McKinnon & Peter Wonacott, Outsourcing Work Looms Large in U.S.-India Ties—CEOs from Both Nations Urge Lower Trade Barriers; Fear of Political Backsliding, WALL ST. J., Mar. 4, 2006, at A4.

140. Id.


143. The Federal Circuit noted this point when rejecting Microsoft’s argument that Pellegrini should control in the AT&T case. AT&T Corp. v. Microsoft Corp., 414 F.3d 1366, 1370 (Fed. Cir. 2005); see also supra note 88 and accompanying text.
THE EXPORT-IMPORT DILEMMA

information products to avoid entirely. Even though U.S. patent law cannot affect foreign sales of infringing products made abroad, infringing products made abroad which are sold or used in the United States violate § 271(a). Under this reasoning, potential infringers would not want to move production abroad, despite the potential freedom from infringement under § 271(f), because they would still be selling extensively in the U.S. market and thus infringing § 271(a). Furthermore, the § 271(g) restrictions do not change the import of software much, because software is generally not the product of a patented process so much as a patented process itself.

The method of distribution of information products such as software changes quickly, however, as the AT&T court observed. Software can be distributed in the traditional manner, or it can reside on a server outside the United States, as seen in the recent NTP, Inc. v. Research In Motion, Ltd. case. The court in that case held that “a process cannot be used ‘within’ the United States as required by section 271(a) unless each of the steps is performed within this country.” Under this holding, a software distributor concerned with infringing a United States software process patent could run part of the process on a server outside of the United States. This removes the possibility of process patent infringement under § 271(a) in the United States.

IV. REFORM SUGGESTIONS

The gulf between the §§ 271(f) and (g) cases has not gone unnoticed. Scholarly articles, judicial opinions, and briefs presented to both the Federal Circuit and the Supreme Court have made suggestions to reconcile the two statutes. This Part examines those approaches and how they might address the original protectionist goals of both statutes.

A. THE PHYSICAL COMPONENTS TEST

Some recent approaches to resolving the divide between the §§ 271(f) and (g) cases have centered around what could be called a “physical components” test for § 271(f) components. Under this
approach, exported components of patented inventions would be considered “components” under § 271(f) only if they are analogous to the manufactured parts of physical machines, not unlike the shrimp deveining machine parts sent abroad in the original Deepsouth case.\textsuperscript{150} This approach, while allowing software to qualify for § 271(f) liability in limited circumstances,\textsuperscript{151} would effectively exclude most, if not all, process patents from protection.

Judge Lourie endorsed such an approach in his dissent to the Federal Circuit’s denial for a rehearing in Union Carbide.\textsuperscript{152} Acknowledging that software can be a component of a patented process under § 271(f), Judge Lourie suggested limiting § 271(f) components to “include what traditionally would be physical components, but which, in an electronic world, supplied electronically, are the equivalent of physical components.”\textsuperscript{153} Under this reading, § 271(f) would not apply to process patents at all, as “the whole tenor of [§ 271(f)] relates to physical inventions, i.e., apparatus or compositions, not methods.”\textsuperscript{154} However, it would apply to software, at least so long as that software could be considered an equivalent to physical components.\textsuperscript{155}

The major problem with the physical components test is that it is difficult to apply outside of the context of litigation. If the standard is “analogous to a physical component,” how does a business executive faced with a decision as to whether to perform work abroad or in the United States decide what, precisely, is analogous to a physical component? Does this test merely exclude steps of process patents (effectively overruling Union Carbide) or does it exclude software as well, on the grounds that software is not equivalent to a physical component?

One commentator suggests that liability under § 271(f) should only apply to software in compiled, machine-readable, executable format, not the original, human-generated source code, effectively applying the physical components approach to software.\textsuperscript{156} The export of a compiled program would trigger liability, but the export of source code would not. Again, however, this is a difficult test for businesses to apply.

\textsuperscript{150} See supra note 9.
\textsuperscript{151} See Tietsworth, supra note 149, at 441–43.
\textsuperscript{153} Id.
\textsuperscript{154} Id.
\textsuperscript{155} Id.
\textsuperscript{156} See Tietsworth, supra note 149, at 441–45. Computer programmers write software by first writing source code in human-readable languages such as C, C++, or Java, which is then compiled into machine-readable format, called executable format. See also Gates Rubber Co. v. Bando Chem. Indus., Ltd., 9 F.3d 823, 835 (10th Cir. 1993) (“The computer program is written first in a programming language, such as Pascal or Fortran, and then a binary language consisting of zeros and ones.”).
Furthermore, in many technologies the line between compiled executable code and human-readable source code is not clearly defined. In fact, some may argue that the line between compiled code and source code does not exist at all; the Federal Circuit observed in Eolas that even something as fundamental as "software and hardware...are practically interchangeable in the field of computer technology....[S]oftware converts its functioning code into hardware and vice versa." One must then ask what it means to export software that is analogous to a physical component. Is software that is retrieved from a server in the United States exported? The physical components test, as applied to software as an example, is hard for businesses to apply. While the operation of the common law may eventually bring clarity, the pace at which the market operates far outstrips the pace of the judicial system. The safer decision for a business fearing § 271(f) liability would be to produce the software entirely abroad.

B. THE TANGIBILITY TEST

Other commentators and several amicus briefs filed in recent Federal Circuit cases suggest a narrower variation of the physical components test that would fully exclude software and other so-called intangible components. This approach would also exclude all process patents from § 271(f) liability. Under this approach, § 271(f) would apply only to the components of physical apparatus or systems, such as the shrimp deveining machine from Deepsouth.

An initial version of the proposed Patent Reform Act of 2005 included this stricter reading of § 271(f), requiring that components of patented inventions be "tangible items" that "combine physically with

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157. There are many commonly used scripting languages that are not compiled. Tietzworth, supra note 149, provides the example of code burned into hardware, such as found on an EPROM, flash, or programmable logic device.
158. Eolas Techs., Inc. v. Microsoft Corp., 399 F.3d 1325, 1339 (Fed. Cir. 2005).
159. See, e.g., Knight, supra note 133; see also Brief for Netscape Communications Corp. et al. as Amici Curiae Supporting Defendant-Appellant at 6, Eolas Techs., Inc. v. Microsoft Corp., 399 F.3d 1325 (Fed. Cir. 2005) (No. 04-1234) ("[T]he proper inquiry [in applying § 271(f)] is whether a defendant manufactures domestically physical components of each specific infringing combination."); Brief for Autodesk, Inc. et al. as Amici Curiae Supporting Defendant-Appellant at 4-5, Eolas, 399 F.3d 1325 (No. 04-1234) ("The term 'patented invention' in § 271(f) refers to physical embodiments whose components, if any, are themselves physical."); Brief for Microsoft Corp. as Amicus Curiae Supporting Defendant-Appellant at 5, NTP, Inc. v. Research In Motion, Ltd., 418 F.3d 1282 (Fed. Cir. 2005) (No. 03-1615) ("[A] 'component of a patented invention' in § 271(f) refers to physical components regardless of whether the patent claims are directed to methods or products, and regardless of the technology at issue."); Brief for Shell Oil Co. et al. as Amici Curiae Supporting Defendant-Appellant at 10, Eolas, 399 F.3d 1325 (No. 04-1234) (petition for rehearing en banc) ("Congress associated 'components' with only certain patented inventions, which it listed as 'machine, manufacture, combination, or composition.' Without question, those are all physical structures or apparatus.").
160. See supra note 9.
This version would have effectively overturned the *Eolas* decision, because the *Eolas* court had explicitly found that § 271(f) did not impose a tangibility requirement on components of a patented invention. However, this language did not make it into the introduced version of the proposed bill.

Proponents of the tangibility test cite the Congressional Record as supporting the concept that § 271(f) does not apply to intangible components. They also point to the fact that the Federal Circuit spent considerable time in the *Bayer* decision picking through the Congressional Record to determine that at the time Congress only considered physical, tangible goods for the purposes of § 271(g), even though the two statutes are entirely different in the liability they establish. The *Bayer* court had concluded that "there is no indication of any intent to reach products other than tangible products produced by manufacturing processes" by the proponents of § 271(g). While this is true of the excerpts of the Congressional Record that the *Bayer* court examined, it is also true that the same Record does not indicate an intent to exclude software or other intangible goods. The conclusion that Congress meant to exclude intangible goods from either §271(f) or § 271(g) is premature. There is no explicit statement in the Congressional Record that Congress meant to exclude intangible information, just that Congress clearly meant to include products produced by manufacturing processes. In the mid-1980s, it was not at all clear that software could be patented as a process, thereby triggering the protection of § 271(g). Nor was it clear that software was even patentable subject matter, which, under the reasoning of *Eolas*, is one of the reasons that it can be considered a component under § 271(f).

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161. The proposed amendment would have added the following to § 271(f): "(3) An item supplied in or from the United States is not a 'component' under this section unless the item is a tangible item that is itself combined physically with other components to create the combination that is alleged to infringe." PATENT ACT OF 2005, 109TH CONG. (Comm. Print 2005), available at http://patentlaw.typepad.com/patent/DraftPatentStatuteDDC.pdf.

162. *Eolas*, 399 F.3d at 1340 ("[T]he language of § 271(f) does not impose a requirement of 'tangibility' on any component of a patented invention.").


164. See, e.g., Knight, * supra* note 133.


166. Id. at 1375.

167. See * supra* note 16.

168. Id.

169. The 1998 *State Street* decision removed a fundamental limitation on patenting software by determining that a software program was patentable. State St. Bank & Trust Co. v. Signature Fin. Group, 149 F.3d 1368, 1375 (Fed. Cir. 1998) ("[S]o long as a process produces a 'useful, concrete, and tangible result' . . . [it is] statutory subject matter, even if the useful result is expressed [only] in numbers . . . ").

170. See * supra* note 80 and accompanying text.
first Federal Circuit case to permit the patenting of what could be considered software was only decided in 1994.\(^{171}\) That decision relied heavily on the physical structure of the invention, which was tied to the "intangible" software code at issue.\(^{172}\) It was not until a 1999 Federal Circuit decision that it was clear that software could be patented without reciting physical structure.\(^{173}\)

It is to be expected that Congress did not refer to intangible goods when passing §§ 271(g) and (f); at the time of passage, it was not at all clear that patents could cover amorphous inventions such as information or software. Congress did not discuss intangible inventions because the concept was not present at the time. Looking to the Congressional Record to justify the exclusion of intangible products such as software is therefore not a good argument.

As critics have noted, nowhere in the statutory language of § 271(f) is there an exclusion of intangible items.\(^{174}\) The language of § 271(f) does not restrict the statute to apparatus claims, a limitation that could have been easily made at the time.

C. THE "PRIMARY INFRINGING USE" TEST

One recent suggestion for resolving the conflicts between §§ 271(f) and (g) is to approach the issue of extraterritorial liability through § 271(a).\(^{175}\) Under this approach, courts would resolve patent infringement cases based on the economic impact on the United States market, following the approach that the *NTP v. Research in Motion* panel took\(^{176}\) and paralleling in some aspects the rejected approach suggested by the plaintiff in *Eli Lilly* for assessing liability under § 271(g).\(^{177}\) The pivotal factor for assessing infringement liability under this approach is whether the primary use of the infringing product occurred within the United States, thus violating § 271(a).\(^{178}\)

Again, however, this is a difficult approach to take outside of the context of litigation. For a company that does business in several

\(^{171}\) In re Allapat, 33 F.3d 1526, 1544 (Fed. Cir. 1994) (en banc).
\(^{172}\) Id. at 1544-45.
\(^{173}\) See AT&T Corp. v. Excel Comm'ns Inc., 172 F.3d 1352, 1358-59 (Fed. Cir. 1999).
\(^{176}\) Id. at 364-65 (analyzing NTP, Inc. v. Research in Motion, Inc., 392 F.3d 1336 (Fed. Cir. 2004)).
\(^{177}\) See supra note 55 and accompanying text.
\(^{178}\) Morris, supra note 175.
countries, it could be quite difficult to assess whether the primary infringing use occurred within the United States. Faced with the risk of liability under § 271(f), the safer decision for a multinational corporation would simply be to produce the infringing product entirely abroad.

CONCLUSION

The AT&T court, as noted above, did not give much credence to the idea that expanding the reach of § 271(f) would encourage the export of jobs from the United States. Instead, like the Supreme Court in Deepsouth, the Federal Circuit issued a clear invitation to Congress to address the issue. The decisions do encourage the export of jobs, but the court is right in that the appropriate remedy is legislative.

Professor Donald Chisum, a well-known commentator, has suggested repealing § 271(f) entirely as bad policy. He suggests that § 271(f) is “bad policy because it punishes those who produce components domestically and exports them and rewards those who move all production offshore.” The divergence between §§ 271(g) and (f) could be entirely removed by repealing § 271(f), which is both the less defined and the broader of the two statutes.

Repealing § 271(f) entirely is the best approach. It saves business executives from having to read Federal Circuit tea leaves as to what would be considered a component. It clarifies questions as to what triggers § 271(f) liability. Companies that move all production offshore would not be rewarded with reduced liability as compared to those companies that do some production in the United States and some abroad. Repealing § 271(f) would encourage manufacturers to keep jobs in the United States, especially jobs in industries such as software or other information services that are easily exported.

179. AT&T Corp. v. Microsoft Corp., 414 F.3d 1366, 1372 (Fed. Cir. 2005).
180. See supra note 14.
181. Donald S. Chisum, Reforming Patent Law Reform, 4 J. MARSHALL REV. INTELL. PROP. L. 336, 347 (2005) [hereinafter Chisum, Reform]; Donald S. Chisum, Normative and Empirical Territoriality in Intellectual Property: Lessons from Patent Law, 37 VA. J. INT’L L. 603, 605 (1997) (“Assessed in terms of economic policy, § 271(f) is ill-conceived. It was presumably an attempt to close a loophole created by Deepsouth, but its most immediate effect is to create one more incentive for U.S. companies who compete in foreign markets to move their manufacturing facilities abroad.”).
182. Chisum, Reform, supra note 181, at 347.