

LEGISLATIVE BALLAST: THE CASE FOR REPEALING 35 U.S.C. § 271(F)

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INTRODUCTION

Driven by concerns regarding the decline in American innovation, Congress passed the Patent Law Amendments Act of 1984.¹ The Act, in direct response to the Supreme Court’s 1972 decision in *Deepsouth Packing Co. v. Laitram Corp.*,² included a provision extending liability for U.S. patent infringement to those who supply “all or a substantial portion of the components of a patented invention” for assembly overseas.³ The Supreme Court, in a series of decisions, has construed the statute narrowly.⁴ Most recently, the Court held that a “substantial portion” was, at minimum, more than one.⁵ Yet, it declined to set forth a test for determining how to identify components or what constitutes a “substantial portion.”⁶

This Note argues (1) that the statute was unnecessary in response to *Deepsouth*, (2) that it provides incentives that can be harmful to both the U.S. economy and technological innovation, and (3) that Congress should repeal the statute. Specifically, Part I recounts the history of the *Deepsouth* litigation, Part II describes the subsequent legislative action and judicial interpretation, and Part III describes the recent *Life Technologies Corp. v. Promega Corp.* litigation.⁷ Part IV explores incentives that arise under both *Deepsouth* and the current statute (as interpreted in *Life Technologies*), and Part V concludes that legislative action was likely both unnecessary to protect U.S. manufacturers and contrary to the Constitutional mandate to promote progress of the useful arts.

1. Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383 (codified as amended in scattered sections of 35 U.S.C.).

2. 406 U.S. 518 (1972), *superseded by statute*, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383; *see* *Life Techs. Corp. v. Promega Corp.*, 137 S. Ct. 734, 742–43 (2017) (first citing *Deepsouth*, 406 U.S. at 526; and then citing *Microsoft Corp. v. AT&T Corp.*, 550 U.S. 437, 444 (2007)).

3. Patent Law Amendments Act § 101 (codified at 35 U.S.C. § 271(f)(1) (2012)).

4. *See* discussion *infra* Section II.C.

5. *See Life Techs.*, 137 S. Ct. at 743.

6. *See id.* (Alito, J., concurring) (“[T]oday’s opinion establishes that more than one component is necessary, but does not address *how much* more.”).

7. 137 S. Ct. 734.

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I. THE RISE AND FALL OF DEEPSOUTH PACKING COMPANY

The Constitution provides that “[t]he Congress shall have [the] Power . . . [t]o promote the Progress of . . . useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their . . . Discoveries.”⁸ Congress exercised that power by granting limited exclusive rights to inventors in the form of patents.⁹ Granting exclusive patent rights, however, can create friction with both extraterritoriality¹⁰ and antitrust¹¹ concerns. Those tension have played a major role in both the legislative and judicial development of patent law and were forefront in the *Deepsouth* saga.

A. A Climate Ripe for Patent Reform

The Patent Act of 1952 codified existing patent law,¹² including, *inter alia*, the various infringement doctrines.¹³ That legislation remained unchanged prior to the Supreme Court’s 1972 *Deepsouth* decision,¹⁴ but a serious effort at patent reform was already underway.¹⁵ In 1952, America was an industrial powerhouse and U.S. manufacturing was strong.¹⁶ By the early 1970s though, concerns regarding the decline in U.S. innovation were mounting and the trade deficit was rising.¹⁷ Against

8. U.S. Const. art. I, § 8, cl. 8.

9. See FRED WARSHOFKY, *THE PATENT WARS: THE BATTLE TO OWN THE WORLD’S TECHNOLOGY* 38 (1994).

10. See generally Timothy R. Holbrook, *Symposium: Negotiating IP’s Boundaries in an Evolving World: Boundaries, Extraterritoriality, and Patent Damages*, 92 NOTRE DAME L. REV. 1745 (2017) (providing an in-depth discussion of the presumption against extraterritoriality as it relates to intellectual property). Jurisdictional tension also existed between states prior to the first federal Patent Act in 1790. See WARSHOFKY, *supra* note 9, at 34–37.

11. See Michael A. Carrier, *Unraveling the Patent-Antitrust Paradox*, 150 U. PA. L. REV. 761, 762–63 (2002).

12. See Hugh Scott & Dennis Unkovic, *Patent Law Reform: A Legislative Perspective of an Extended Gestation*, 16 WM. & MARY L. REV. 937, 937–38 (1975). Minor changes to existing patent law doctrine were adopted, but no attempt was made at comprehensive reform. *Id.*

13. 35 U.S.C. § 271 (1952).

14. Compare *id.*, with 35 U.S.C. § 271 (1984) (adding subsection (e), where it is not an act of infringement “to make, use, or sell a patented invention . . . solely for uses reasonably related to the development and submission of information under a Federal law which regulates the manufacture, use, or sale of drugs.”).

15. See Scott & Unkovic, *supra* note 12, at 938.

16. See generally THE GOLDEN AGE OF CAPITALISM: REINTERPRETING THE POSTWAR EXPERIENCE (Stephen A. Marglin & Juliet B. Schor eds., Oxford Univ. Press 1990) (discussing post-World War II economic growth and subsequent recession).

17. See generally *id.*

this backdrop, *Deepsouth* became a poster child for patent reform.¹⁸

B. Invention in the Shrimping Industry

In the 1940s through 1950s, a shrimp peeling machine revolutionized the shrimping industry. That machine, patented by J.M. Lapeyre and commercialized by Peelers, Inc. (later Laitram Corp.), was declared an engineering landmark and described as “the most important development in the mechanization of the shrimp processing industry.”¹⁹ In the 1950s, while the price of other forms of protein were skyrocketing, the cost of shrimp was decreasing.²⁰

Following the success of the peeling technology, Peelers developed and patented supplemental technologies including machines to clean, slit, and sort the shrimp.²¹ The technology giving rise to the *Deepsouth* litigation—a shrimp deveining machine—was one of those supplemental technologies.²² The Skermetta family held a patent on an alternative shrimp deveining machine manufactured by Deepsouth Packing Co. (“Deepsouth”) and competed with Laitram in a two-competitor market.²³

C. The Deepsouth Litigation

1. A “Win” for Laitram?

While Congress was busy with efforts at patent reform, Laitram was busy litigating its patent rights and testing the limits of antitrust law.²⁴

18. See discussion *infra* Section II.D.

19. Jean Lapeyre et al., *The Lapeyre Automatic Shrimp Peeling Machine, Model ‘A’*, No. 572, 1979, AM. SOC’Y MECHANICAL ENGINEERS 18, 20 (Sept. 25, 2004), <https://www.asme.org/wwwasmeorg/media/ResourceFiles/AboutASME/Who%20We%20Are/Engineering%20History/Landmarks/230-Lapeyre-Automatic-Shrimp-Peeling-Machine.pdf>.

20. *Id.* at 19.

21. *Laitram Corp. v. Deepsouth Packing Co.*, 279 F. Supp. 883, 885 (E.D. La. 1966).

22. See *Laitram Corp. v. Deepsouth Packing Co.*, 301 F. Supp. 1037, 1039 (E.D. La. 1969).

23. *Id.* at 1040, 1043. Deepsouth manufactured the Skermetta machines, and by 1969 Laitram and Deepsouth together had captured the entire Gulf Coast market. *Id.* at 1053 n.5.

24. See *Laitram*, 279 F. Supp. at 885 (comparing the scope of Laitram’s litigation history to something exceeding Dickens’s fictional, never-ending, Jarndyce and Jarndyce litigation); *id.* at 885–86 (discussing Laitram’s antitrust litigation). Peelers’s business plan included the worldwide manufacture and marketing of the peeling machines, but the machines were leased based on the number of revolutions made on the main drive motor rather than outright sale. See *id.* at 886. The Federal Trade Commission litigation found that “Peelers had committed unfair acts by selling shrimp processing machines to foreign canners while maintaining a policy of leasing them to domestic canners, and by leasing machines at a substantially higher rate to canners in the Northwestern states than the rate charged lessees in the Gulf Coast area.” *Id.* The Fifth Circuit affirmed the latter. *Id.* (citing *LaPeyre v. FTC*, 366 F.2d 117 (5th Cir.

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Part of that litigation included the infringement dispute between Laitram and Deepsouth over the deveining machine that gave rise to the *Deepsouth* decision.²⁵ The district court held that Deepsouth was infringing Laitram's patents.²⁶ Deepsouth appealed, but the Fifth Circuit affirmed and granted an injunction.²⁷ Laitram had won the battle, but the war was not over.

2. A Loophole for Deepsouth?

Laitram's two patents were each "combination" (or "improvement") patents.²⁸ The "slitter" patent elements, as depicted in Figure 11 of U.S. Patent No. 2,694,218, below, included: (1) an inclined trough (13 and 14); (2) the knives in the trough, which sliced the backs of the shrimp as they moved down the trough (clamped under 16); and (3) means (water spray) to move shrimp down the trough (19).²⁹

1966)).

25. See *Laitram*, 279 F. Supp. at 885; *Laitram Corp. v. Deepsouth Packing Co.*, 310 F. Supp. 926 (E.D. La. 1970), *rev'd*, 443 F.2d 928 (5th Cir. 1971), *rev'd*, 406 U.S. 518 (1972), *superseded by statute*, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383. Laitram sued for infringement of its patented deveining machine (U.S. Patent No. 2,694,218 (filed Aug. 19, 1952)) and shrimp vein removing machine (U.S. Patent No. 2,825,927 (filed July 8, 1954)). *Laitram*, 279 F. Supp. at 885, 885 nn.1–2. Deepsouth challenged the validity of both patents, and also sought a declaratory judgment regarding the validity of a third patent—the peeling machine patent (U.S. Patent No. 2,778,055 (filed Apr. 10, 1952)). *Id.* at 885, 885 n.3. Laitram dedicated the peeling machine to the public, rendering the validity challenge moot. *Id.* at 891.

26. *Laitram*, 301 F. Supp. at 1046, 1066 (finding infringement of the '218 Patent and the '927 Patent under the doctrine of equivalents).

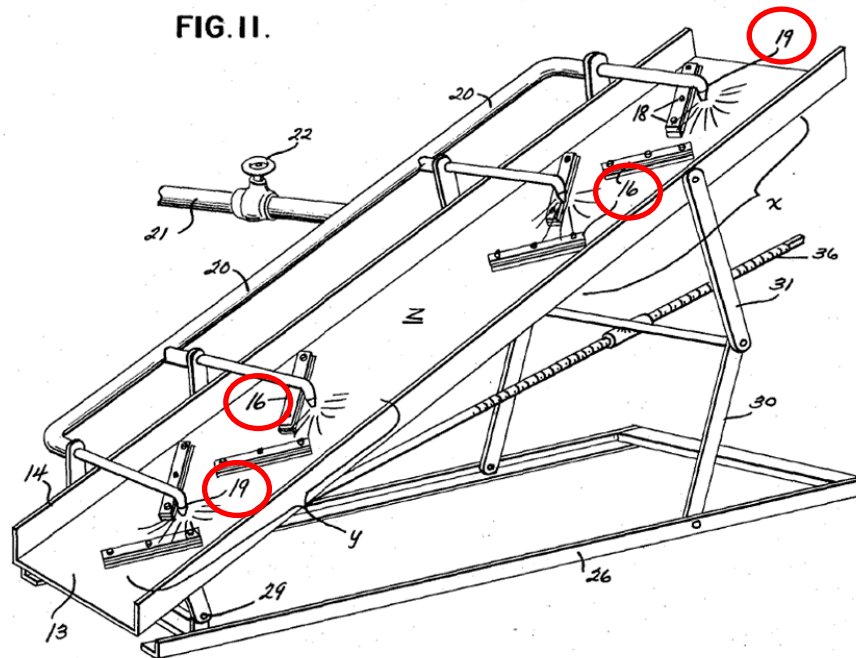
27. *Laitram*, 443 F.2d at 932, 936.

28. *Deepsouth*, 406 U.S. at 520–21. Both the slitter and the tumbler are combination patents; that is,

none of the parts referred to are new, and none are claimed as new; nor is any portion of the combination less than the whole claimed as new, or stated to produce any given result. The end in view is proposed to be accomplished by the union of all, arranged and combined together in the manner described. And this combination, composed of all the parts mentioned in the specification, and arranged with reference to each other, and to other parts of the [machine] in the manner therein described, is stated to be the improvement, and is the thing patented.

Id. (quoting *Prouty v. Ruggles*, 41 U.S. 336, 341 (1842)).

29. *Deepsouth*, 406 U.S. at 521; '218 Patent fig.11 (circles added to highlight elements noted in text).



Once the shrimp had passed through the “slitter,” the vein was exposed, but only sometimes removed.³⁰ To complete the vein removal, the shrimp were passed through a tumbler which would hook the vein and remove it.³¹ The “deveiner” patent elements, as depicted by Figures 1 and 11 of U.S. Patent No. 2,825,927, below, included: (1) a supporting member (25); (2) a “lip” (24); and (3) a “means” for moving the shrimp (water jets, not pictured).³²

30. *Laitram*, 301 F. Supp. at 1046.

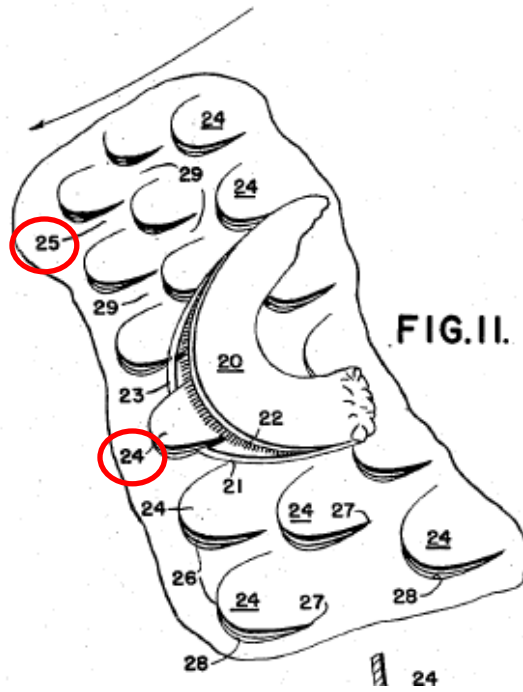
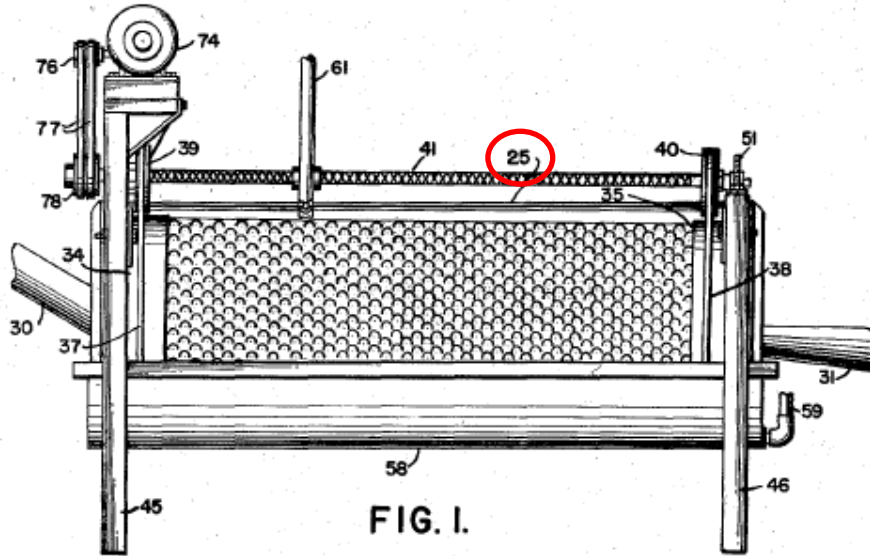
31. *Id.*

32. *Deepsouth*, 406 U.S. at 521; U.S. Patent No. 2,825,927 figs. 1 & 11 (filed July 8, 1954) (circles added to highlight elements noted in text). Although recited as separate components, the “supporting member” and the “lip” components together refer to a punched metal material that was available as a staple of commerce. Brief for the Petitioner at 8, *Deepsouth*, 406 U.S. 518 (No. 71-315).

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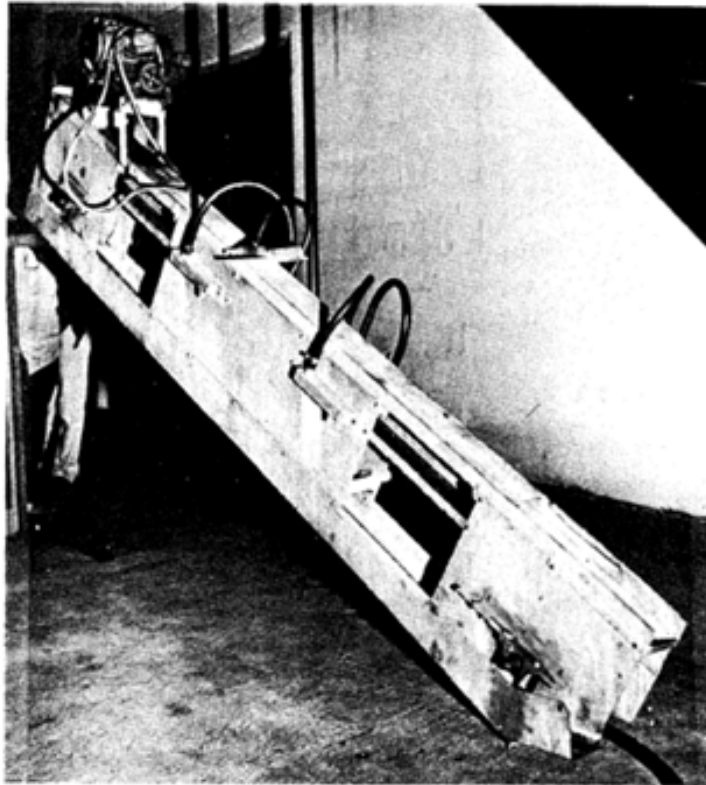
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Deepsouth's infringing deveining machine, when manufactured, looked like this³³:

Exterior



The individual components of the machine were not patentable because they did not meet the statutory requirements for patentability: utility, novelty, and non-obviousness.³⁴ Therefore, Deepsouth (or anyone else) was free to make, use, and sell the individual, unpatented components within the United States.³⁵ However, the manufacture, use, or sale of the completed deveiner (within the United States) would be an

33. *Laitram*, 301 F. Supp. 1037 at 1051.

34. See 35 U.S.C. §§ 101–103 (1952); see also *Deepsouth*, 406 U.S. at 520–21.

35. See 35 U.S.C. § 271(a) (2012) (emphasis added) (“[W]hoever without authority makes, uses, offers to sell, or sells *any patented invention, within the United States . . .* during the term of the patent therefor, infringes the patent.”); see also *Deepsouth*, 406 U.S. at 521.

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infringement of Laitram's patents.³⁶ Nevertheless, had Deepsouth sold the components to a U.S. customer who assembled ("made") them into an infringing deveiner, that customer would be liable for infringement and Deepsouth could have been held indirectly liable.³⁷ Yet, Deepsouth proposed to sell the individual components not to a U.S. customer, but to a Brazilian customer for assembly outside of the United States.³⁸ Because there would be no infringing assembly in the United States, there could be no direct liability, as case law at the time dictated that for indirect liability to attach, there must be an underlying act of direct liability.³⁹

Therefore, Deepsouth asked the court to "make it clear that [the injunction] does not prohibit the manufacture and sale of a slitter and deveiner unit in unassembled form for export to a Brazilian customer."⁴⁰ The court observed that "[e]very court of appeal that has considered an actual situation in any way resembling the one here proposed has held that the sale of a product for export in unassembled form is not an infringement of the domestic patent."⁴¹ Deepsouth's proposed actions fell outside the scope of the injunction, so the court held that no modification was necessary.⁴² Laitram appealed and the Fifth Circuit overturned.⁴³

The Fifth Circuit, while noting that the district court was correct in its interpretation of the Second, Third, and Seventh Circuit precedent, rejected the notion that full assembly ("operable assembly") was required for infringement.⁴⁴ Instead, the Fifth Circuit held that "when all the parts

36. See 35 U.S.C. §§ 154(a)(1), 271(a) (2012); see also *Deepsouth*, 406 U.S. at 521–23.

37. See 35 U.S.C. § 271(b)–(c); *Deepsouth*, 406 U.S. at 522–23.

38. See *Laitram Corp. v. Deepsouth Packing Co.*, 310 F. Supp. 926, 926 (E.D. La. 1970), *rev'd*, 443 F.2d 928 (5th Cir. 1971), *rev'd*, 406 U.S. 518 (1972), *superseded by statute*, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383.

39. See *Deepsouth*, 406 U.S. at 526–27 (quoting *Mercoid Corp. v. Mid-Continent Inv. Co.*, 320 U.S. 661, 677 (1944) (Frankfurter, J., dissenting)) (first citing 35 U.S.C. § 271 (1970); and then citing *Dowagiac Mfg. Co. v. Minn. Moline Plow Co.*, 235 U.S. 641, 650 (1915)) ("[I]t is established that there can be no contributory infringement without the fact or intention of a direct infringement. 'In a word, if there is no [direct] infringement of a patent there can be no contributory infringer.' . . . The statute makes it clear that it is not an infringement to make or use a patented product outside of the United States.")

40. *Laitram*, 310 F. Supp. at 926.

41. *Id.* at 927.

42. *Id.* at 927–29 (first citing *Radio Corp. of Am. v. Andrea*, 79 F.2d 626, 627 (2d Cir. 1935); then citing *Cold Metal Process Co. v. United Eng'g & Foundry Co.*, 235 F.2d 224, 230 (3d Cir. 1956); and then citing *Hewitt-Robins, Inc. v. Link-Belt Co.*, 371 F.2d 225, 229 (7th Cir. 1966)).

43. *Laitram Corp. v. Deepsouth Packing Co.*, 443 F.2d 936, 937–38 (5th Cir. 1971) (finding direct infringement under § 271(a) for "making" Laitram's invention), *rev'd*, 406 U.S. 518 (1972), *superseded by statute*, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383.

44. *Id.* at 937.

of a patented machine are produced in the United States and, in merely minor respects, the machine is to be finally assembled for its intended use in a foreign country, that the machine is ‘made’ within the United States” (“substantial assembly”).⁴⁵ Deepsouth petitioned the Supreme Court for Writ of Certiorari and it was granted—the day before the 92nd Congress started its second term—where the patent reform battle raged on.⁴⁶

3. *The Supreme Court Weighs in—and Calls for Congressional Action?*

In a five-to-four decision, the Supreme Court reversed the Fifth Circuit.⁴⁷ The Court, resolving the circuit split, held that for direct infringement, “making” a claimed invention encompassed only “final ‘operable’ assembly,” and nothing less (i.e., not substantial assembly).⁴⁸ Yet, while the Court’s holding turned on its interpretation of “making,” its opinion focused heavily on the extraterritorial reach of 35 U.S.C. § 271⁴⁹:

[W]e 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. To the degree that the inventor needs protection in [foreign] markets. . . [the statutory text] reveals a congressional intent to have him to seek it . . . through patents secured in [those] countries. . . . Respondent holds foreign patents; it does not adequately explain why it does not avail itself of them.”⁵⁰

45. *Id.* at 939.

46. *Deepsouth*, 406 U.S. at 519; *Deepsouth Packing Co. v. Laitrim Corp.*, 404 U.S. 1037, 1037 (1972); *90th to 99th Congresses (1967–1987)*, HIST. ART & ARCHIVES U.S. H.R., <https://history.house.gov/Institution/Session-Dates/90-99/> (last visited Dec. 21, 2018).

47. *Deepsouth*, 406 U.S. at 525.

48. *Id.* at 527–28. For an in-depth discussion of the precedent and a critique of both the operable and substantial assembly approaches, see generally Charles M. Kerr, *Operable Versus Substantial Assembly of Patented Combinations: A Critique of Deepsouth v. Laitram*, 26 STAN. L. REV. 893 (1974).

49. Compare *Laitrim Corp. v. Deepsouth Packing Co.*, 443 F.2d 936, 938 (5th Cir. 1971) (framing the critical issue as “determin[ing] the meaning and scope of the word ‘makes’ in § 271(a) within the context of this litigation” with no discussion of extraterritoriality), *rev’d*, 406 U.S. 518 (1972), *superseded by statute*, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383, and *Deepsouth*, 406 U.S. at 519 (framing the critical issue as whether “Deepsouth [is] barred from the American market by Laitram’s patent, also foreclosed by the patent laws from exporting its deviders, in less than fully assembled form, for use abroad[.]” and including a discussion of extraterritoriality).

50. *Deepsouth*, 406 U.S. at 531 (quoting *Brown v. Duchesne*, 60 U.S. 183, 195 (1857))

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Even the dissenters, who questioned the strength of the “operable assembly” precedent, expressed their concerns regarding the scope of the extraterritorial reach of U.S. patents.⁵¹

Moreover, the Court noted that even if it had interpreted “making” to encompass less than “operable assembly,” it would have relied on the presumption against extraterritoriality to reach the same conclusion.⁵² Thus, it seems that regardless whether a “substantial” or “operable” assembly test had been adopted, *Deepsouth* would not have been liable for its export activities because of its extraterritorial nature. The result of explicitly basing the decision on extraterritoriality rather than assembly would have created two different standards for direct infringement—one for purely domestic activity and one which involved foreign activity.⁵³

(citing *Boesch v. Graff*, 133 U.S. 697, 703 (1890)).

51. *See id.* at 533–34 (Blackmun, J., dissenting).

[The majority’s decision allows] an infringer to set up shop next door to a patent-protected inventor whose product enjoys a substantial foreign market and deprive him of his valuable business. If this Constitutional protection is to be fully effectuated, it must extend to an infringer who manufactures in the United States and then captures the foreign markets from the patentee. The Constitutional mandate cannot be limited to just manufacturing and selling within the United States. The infringer would then be allowed to reap the fruits of the American economy—technology, labor, materials, etc.—but would not be subject to the responsibilities of the American patent laws. We cannot permit an infringer to enjoy these benefits and then be allowed to strip away a portion of the patentee’s protection.

Laitram, 443 F.2d at 939.

52. *See Deepsouth*, 406 U.S. at 532 (“In sum: the case and statutory law resolves this case against the respondent. When so many courts have so often held what appears so evident—a combination patent can be infringed only by combination—we are not prepared to break the mold and begin anew. And were the matter not so resolved, we would still insist on a clear congressional indication of intent to extend the patent privilege before we could recognize the monopoly here claimed. Such an indication is lacking.”).

53. Subsequent decisions would make it clear that the perceived extraterritorial reach in *Deepsouth* (and not necessarily the lack of operable assembly) was the distinguishing factor when similar cases arose with only a domestic reach. The Federal Circuit held in *Paper Converting Machine Co. v. Magna-Graphics Corp.* that although an alleged infringer never assembled a complete machine, there was operable assembly: “[when] significant, unpatented assemblies of elements are tested during the patent term, enabling the infringer to deliver the patented combination in parts to the buyer, without testing the entire combination together as was the infringer’s usual practice, testing the assemblies can be held to be in essence testing the patented combination and, hence, infringement.” 745 F.2d 11, 19–20 (Fed. Cir. 1984). The court justified its holding on policy grounds and distinguished *Deepsouth*, *inter alia*, on the grounds that that *Deepsouth* “was intended to be narrowly construed as applicable only to the issue of the extraterritorial effect of the American patent law.” *Paper Converting*, 745 F.2d at 17. The dissenters in the case argued that the majority opinion was “no less than a reversal of *Deepsouth*.” *Id.* at 26 (Nies, J., dissenting-in-part). *See generally* Stuart Watt, *Patent Infringement: Redefining the “Making” Standard to Include Partial Assemblies*, 60 WASH.

The Supreme Court's decision resulted in a "loophole" for domestic manufacturers to escape liability by shipping patented devices overseas unassembled. As a result, U.S. patent law could not prevent Deepsouth from stealing away one of Laitram's foreign customers.⁵⁴ Laitram thought that this result was extreme and unfair, a sentiment that was shared by others favoring a strong U.S. patent system.⁵⁵

II. CONGRESS RESPONDS

A. Deepsouth Becomes a Poster Child for Patent Reform

Efforts to pass patent reform legislation intensified during the 93rd Congress (1973–1974).⁵⁶ In urging the Senate to resume reform efforts, the Chairman of the Subcommittee on Patents, Trademarks, and Copyrights requested that a May 1973 article from *Fortune Magazine* be printed in the record.⁵⁷ That article outlined numerous problems with the patent system, bemoaned the Court's attack on patent owners, and referenced the *Deepsouth* decision directly—characterizing it as a problem for inventors.⁵⁸

L. REV. 889 (1985) (discussing the interaction between *Deepsouth* and *Paper Converting*). However, when the issue came to the Federal Circuit again, in a case that once again implicated extraterritoriality, the Federal Circuit held that the making and testing of unassembled components in the United States is *not* a direct infringement under § 271(a). *Waymark Corp. v. Porta Sys. Corp.*, 245 F.3d 1364, 1366 (Fed. Cir. 2001). The court distinguished *Paper Converting* on the grounds that it "addressed enforcement of a patent beyond its expiration," and that although *Deepsouth* was not controlling in *Paper Converting*, it was controlling in *Waymark* because "[l]ike the accused infringer in *Deepsouth*, Porta Systems exported components for assembly in a foreign country." *Id.* at 1367 (first citing *Paper Converting*, 745 F.2d at 17; and then citing *Deepsouth*, 406 U.S. at 523–24).

54. The Brazilian customer was a customer of Laitram prior to the sale by Skrmetta Machinery ("Deepsouth"). Brief for the Respondent at 22, *Deepsouth*, 406 U.S. 518 (No. 71-315).

55. *Id.* at 22–23. ("The extreme situation decided on the basis of the 'rule' of *Andrea* . . . depicts the unfairness of not granting injunction and monetary recovery in the case before this Court: a patent is issued on a mechanical device which must, *for practical* reasons, be shipped in two or more parts to the foreign country. Unless this Court affirms the decision below, a United States patent gives absolutely no protection against exporting manufacturers."). See discussion *infra* Section II.A–B.

56. See Scott & Unkovic, *supra* note 12, at 943.

57. 119 CONG. REC. 15178–80 (1973) (statement of Sen. McClellan); Robert G. Hummerstone, *How the Patent System Mousetraps Inventors*, FORTUNE, May 1973, reprinted in 119 CONG. REC. 15179–80.

58. See generally Hummerstone, *supra* note 57. It has been suggested that the Court split in the *Deepsouth* decision was based on the judges' differing attitudes towards the relationship between patent and antitrust laws. See *Panel Discussion: Patents, Technology and Antitrust Enforcement*, 42 ANTITRUST L.J. 78, 105 (1972) (statement of Prof. John C. Stedman).

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B. The Evolution of 35 U.S.C. § 271(f)

Although the pending legislation did not yet include a provision to close the *Deepsouth* loophole, one was quickly proposed.⁵⁹ Guy W. Shoup (Laitram's attorney in the *Deepsouth* litigation), was one of the first to suggest a statute, a similar version of which appeared in several bills introduced during the 93rd and 94th Congresses.⁶⁰

Because of controversy surrounding other areas of reform, however, it was not until the 98th Congress—over a decade after *Deepsouth* was decided—that a patent reform bill was finally passed.⁶¹ It included two new infringement provisions, as follows, which extended liability for patent infringement far beyond the facts of *Deepsouth*:

(f)(1) Whoever without authority supplies or causes to be supplied in or from the United States *all or a substantial portion of the components of a patented invention*, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States, shall be liable as an infringer.

(2) Whoever without authority supplies or causes to be supplied in or from the United States any component of a patented invention that is especially made or especially adapted for use in the invention and not a staple article or commodity of commerce suitable for substantial noninfringing use, where such component is uncombined in whole or in part knowing that such component is so made or adapted and intending that such component will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States, shall be liable as an infringer.⁶²

59. Patent Reform and Modernization Act, S. 2504, 93d Cong. § 271(f) (1973).

60. Compare *Patent Law Revision: Hearings Before the Subcomm. on Patents, Trademarks, and Copyrights of the Comm. on the Judiciary Pursuant to S. Res. 56 on S. 1321*, 93d Cong. 690 (1973) [hereinafter *Patent Hearings*] (statement of Guy W. Shoup, Counsel, Laitram Corporation) (proposing a modification to § 271 that would find infringement where an individual makes, sells, or actively induces either manufacture or sale of a material part of a patented invention outside the United States), with S. 2255, 94th Cong. § 271(f) (1975), S. 473, 94th Cong. § 271(e) (1975), S. 23, 94th Cong. § 271(f) (1975), and S. 2504, 93d Cong. § 271(f) (1973) (proposing similar language that provides protection for patented inventions outside of the United States).

61. Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383. See generally Scott & Unkovic, *supra* note 12 (discussing patent reform efforts).

62. S. 1535, 98th Cong. § 271(e) (as reported on Oct. 5, 1984, passed as Pub. L. No. 98-622 on Nov. 8, 1984, and now codified at 35 U.S.C. § 271(f) (2012)) (emphasis added). All of the bills proposed prior to § 271(f)'s ultimate passage contained just one infringement provision, not two. See S. 1535 § 271(e); S. 2255 § 271(f); S. 473 § 271(e); S. 23 § 271(f); S. 2504 § 271(f). That provision was intended to target the supply of non-staple items (based on

C. Initial Expansive Judicial Interpretation of 35 U.S.C. § 271(f)

While some of the early cases to address the scope of § 271(f) dealt with mechanical devices like *Deepsouth's* deveiner, the courts were soon tasked with applying § 271(f) to different types of technologies and different types of patent claims.⁶³ The scope of § 271(f) began to take shape.⁶⁴ In 2004, the Federal Circuit, in *Pellegrini v. Analog Devices, Inc.*, gave § 271(f) a narrow reading.⁶⁵ The court found that § 271(f)(1) was not implicated when the defendant transmitted instructions on how to manufacture U.S. designed components, when those components were ultimately manufactured entirely outside the United States.⁶⁶

From 2005 to 2006, however, the court expansively defined the scope of § 271(f). First, in *Eolas Technologies, Inc. v. Microsoft Corp.*, it found that a “component” within the meaning of § 271(f)(1) included software code.⁶⁷ The court did not require components to be physical components of machines, as they were in *Deepsouth*.⁶⁸ Second, in *AT&T Corp. v. Microsoft Corp.*, it held that Microsoft was liable for infringement under § 271(f) for *copies* of an operating system that had been replicated overseas from a master version.⁶⁹ Later in 2005, the court, referencing the *Eolas* decision, held that § 271(f) applies to method/process inventions and found liability when Shell Oil Co. exported catalysts used in Union Carbide’s process for ethylene oxide production.⁷⁰ Finally, in 2006, the court held that a showing of intent was

contributory infringement under § 271(c)), a version of which was ultimately codified in § 271(f)(2)). See *Patent Law Improvements Act: Hearing Before the Subcomm. on Patents, Copyrights, and Trademarks of the Comm. on the Judiciary on S. 1535 and S. 1841*, 98th Cong. 22–23 (1984) (statements of Sen. Charles M. Mathias, Jr., Charmain, S. Comm. on Judiciary, and Hon. Gerald J. Mossinghoff, Assistant Secretary and Commissioner of Patents and Trademarks). A second provision (based on induced infringement under § 271(b) and ultimately codified in § 271(f)(1)) was introduced later, seemingly in response to Senator Mathias’s hypothetical scenario where an exporter *sends instructions* for manufacturing an infringing product, “notwithstanding the use of staple products.” See *id.*

63. See William R. Thornwell II, Note, *Patent Infringement Prevention and the Advancement of Technology: Application of 35 U.S.C. § 271(f) to Software and “Virtual Components”*, 73 *FORDHAM L. REV.* 2815, 2819–20 (2005).

64. See *id.*

65. See 375 F.3d 1113, 1118 (Fed. Cir. 2004).

66. *Id.* at 1114–15, 1118–19.

67. 399 F.3d 1325, 1339 (Fed. Cir. 2005).

68. *Id.* at 1339–40. Although both product claims and method claims were at issue in *Eolas*, the court later clarified that the holding in *Eolas* was restricted to product claims—not to method claims. *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 576 F.3d 1348, 1365–66 (Fed. Cir. 2009).

69. 414 F.3d 1366, 1371–72 (Fed. Cir. 2005).

70. *Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co.*, 425 F.3d 1366, 1379–

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required for liability under § 271(f) but that circumstantial evidence of “business history,” including employment and distribution of an engineering manual, qualified as evidence of intent.⁷¹

D. 35 U.S.C. § 271(f) Becomes a Poster Child for Patent Reform?

Patent reform was once again on Congress’s agenda by the 109th Congress (2005–2006). This time it included efforts to repeal § 271(f).⁷² There was concern that its extraterritorial reach, in some situations, may benefit foreign manufacturers and patentees.⁷³ During the 110th Congress, Senator Orrin Hatch indicated that if the Supreme Court did not rule favorably in its upcoming case, a repeal provision would be included the following year.⁷⁴

Section 271(f) was not repealed, but in 2007 the Supreme Court stepped in and changed the course, narrowing the scope of § 271(f).⁷⁵ The Court reversed the Federal Circuit’s 2005 *AT&T* decision, cited *Pellegrini* approvingly, and held that while the master version of the software was a “component,” the software company was not liable because only *copies* were ultimately installed on foreign-made machines.⁷⁶ Thus, there was no liability.⁷⁷ The Court noted that “[a]ny doubt that Microsoft’s conduct falls outside § 271(f)’s compass would be resolved by the presumption against extraterritoriality. . . .”⁷⁸ Section 271(f)’s explicit extraterritorial reach was acknowledged, but the Court

80 (Fed. Cir. 2005), *overruled by Cardiac Pacemakers, Inc.*, 576 F.3d at 1365.

71. *Liquid Dynamics Corp. v. Vaughan Co.*, 449 F.3d 1209, 1222–23 (Fed. Cir. 2006) (quoting *Fuji Photo Film Co. v. Jazz Photo Corp.*, 394 F.3d 1368, 1377 (Fed. Cir. 2005)).

72. *See, e.g.*, S. 3818, 109th Cong. § 271(f) (2006).

73. 152 CONG. REC. S8830 (daily ed. Aug. 3, 2006) (statement of Sen. Hatch).

74. 152 CONG. REC. S4692 (daily ed. Apr. 18, 2007) (statement of Sen. Hatch).

75. *Microsoft Corp. v. AT&T Corp.*, 550 U.S. 437, 454 (2007). While the Supreme Court has not yet weighed in on the issue of whether actual assembly abroad is required for liability to attach under § 271(f), the Federal Circuit held in 2001 that actual combination or assembly of shipped components is not required for liability to attach under § 271(f)(2). *Waymark Corp. v. Porta Sys. Corp.*, 245 F.3d 1364, 1367–68 (Fed. Cir. 2001) (quoting 35 U.S.C. § 271(f)(2) (2012)). Although that holding was limited to § 271(f)(2), its reasoning can also be applied to § 271(f)(1). *See id.*

76. *Microsoft*, 550 U.S. at 446–47, 450 (first citing *AT&T Corp. v. Microsoft Corp.*, No. 01 Civ. 4872 (WHP), 2004 U.S. Dist. LEXIS 3340, at *28–29 (S.D.N.Y. Mar. 5, 2004); and then citing *Pellegrini v. Analog Devices, Inc.*, 375 F.3d 1113, 1117–19 (Fed. Cir. 2004)).

77. *See id.* at 454. Although software copies were held not to be a “component” under § 271(f), the Federal Circuit has noted “that the Supreme Court did not address the meaning of ‘material or apparatus’” in § 271(c) in response to Microsoft’s argument in a later case that its products were not “material or apparatus” for the purpose of contributory infringement of patented methods. *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1321 (Fed. Cir. 2009); *see* 35 U.S.C. § 271(c), (f).

78. *Microsoft*, 550 U.S. at 454.

reiterated that the presumption “remains instructive in determining the extent of the statutory exception.”⁷⁹ Following the Supreme Court’s reversal of *AT&T*, the Federal Circuit held that § 271(f) did not apply to method patents—overturning both *Eolas* and *Union Carbide* to the extent that they implicated method patents.⁸⁰

Most recently, the Federal Circuit addressed the scope of § 271(f)(1) in *Promega Corp. v. Life Technologies Corp.*, finding that (1) a single component could constitute “a substantial portion of the components of [an] invention,” and (2) a party could induce itself to infringe.⁸¹ The Supreme Court took up the first issue and reversed unanimously—again narrowing the scope of § 271(f).⁸²

III. THE LIFE TECHNOLOGIES LITIGATION

A. A Revolution in Biotechnology

The technology at issue in *Life Technologies* was a method for determining identity and kinship by analyzing patterns of short tandem repeats (STR) in genomic DNA.⁸³ The method was an improvement over prior identification methods in that it was fast, highly accurate, and high-throughput.⁸⁴ Like in *Deepsouth*, it was a supplemental technology, enabled by a prior revolutionary invention (here, the polymerase chain reaction (PCR)).⁸⁵ PCR is carried out by annealing oligonucleotide primers to denatured DNA and using a polymerase enzyme (e.g., *Taq*) to

79. *Id.* at 456 (citing *F. Hoffmann-La Roche Ltd. v. Empagran S.A.*, 542 U.S. 155, 161–62, 164–65 (2004)).

80. *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 576 F.3d 1348, 1365 (Fed. Cir. 2009) (overruling *Eolas Techs., Inc. v. Microsoft Corp.*, 399 F.3d 1325 (Fed. Cir. 2005), and *Union Carbide Chemicals & Plastics Tech. Corp. v. Shell Oil Co.*, 425 F.3d 1366 (Fed. Cir. 2005)).

81. 773 F.3d 1338, 1356 (Fed. Cir. 2014).

82. *Life Techs. Corp. v. Promega Corp.*, 137 S. Ct. 734, 743 (2017) (citing 35 U.S.C. § 271(f)(1)); see also G. Edward Powell III, *Commodity Supply and Extraterritorial Patent Infringement in Life Technologies v. Promega*, 12 DUKE J. CONST. LAW & PP SIDEBAR 163, 164 (2017) (summarizing the litigation and the parties’ arguments).

83. *Promega*, 773 F.3d at 1341–42; U.S. Patent No. RE37,984 col. 1 l. 20–23 (filed June 9, 2000) (reissued Feb. 11, 2003). The district court and Federal Circuit litigation related to four Promega patents and one patent owned by a third party (the “Tautz patent”). *Promega*, 773 F.3d at 1342. Life Technologies (“Life Tech”) challenged the validity of Promega’s patents, but not the Tautz patent. *Id.* at 1344 (citing *Promega Corp. v. Life Techs. Corp.*, No. 10-cv-281-bbc, 2011 U.S. Dist. LEXIS 158561, at *30–32 (W.D. Wis. 2011)). The Federal Circuit invalidated Promega’s patents and found the Tautz patent infringed. *Id.* at 1358.

84. *Promega*, 773 F.3d at 1342 (citing *id.* at 1372–73).

85. ‘984 Patent col. 2 l. 17–27; see John M.S. Bartlett & David Stirling, *A Short History of the Polymerase Chain Reaction*, in 226 METHODS IN MOLECULAR BIOLOGY, PCR PROTOCOLS 3 (John M.S. Bartlett & David Stirling eds., 2d ed. 2003) (likening the invention of PCR to the invention of the internet).

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incorporate deoxynucleotide triphosphates (dNTPs) and create extension products.⁸⁶ Iteratively repeating the process results in the exponential amplification of the targeted genomic regions.⁸⁷ The STR method consists of using PCR to amplify regions of the genome that differ in length amongst individuals, and then comparing those differences to determine identity and/or kinship.⁸⁸ The variable regions are targeted for amplification by utilizing oligonucleotide primer sequences that are specific to the target region.⁸⁹ Thus, the inventive aspect of the technology is the primer design and the analysis procedure (rather than the PCR amplification).

The patents in the *Life Technologies* litigation included both method claims and kit claims related to this STR technology. The kits contained the PCR reagents required to amplify STR regions,⁹⁰ including: (1) a mixture of primers, (2) a polymerase enzyme (*Taq*), (3) dNTP nucleotides, (4) a buffer, and (5) template DNA (a control sample to test whether the kit was properly working).⁹¹ After using the contents of the *kit* to amplify the genomic fragments via PCR, the user of the STR *method* must carry out downstream detection and analysis steps.⁹² The *Life Technologies* litigation was based on the kit claims, not the method claims.⁹³

B. 35 U.S.C. § 271(f)—A Life Preserver?

Like in *Deepsouth*, the parties in *Life Technologies* were competitors in a two-competitor market.⁹⁴ However, the facts of *Life Technologies* were mostly dissimilar to the facts of *Deepsouth*. The U.S. patent that Life Technologies (“Life Tech”) infringed (the “Tautz patent”) belonged to a German institution, not a U.S. manufacturer.⁹⁵ Promega and Life

86. U.S. Patent No. 4,683,195 (filed Feb. 7, 1986).

87. *Id.*

88. ‘984 Patent col. 1 *l.* 25–27, 2 *l.* 17–27.

89. *See id.* at col. 2 *l.* 17–27.

90. Promega Corp. v. Life Techs. Corp., 773 F.3d 1338, 1341, 1343 (Fed. Cir. 2014).

91. *Id.* at 1356. On appeal, the parties agreed that the kit contained five elements, and thus the issue of “how to identify the ‘components’ of a patent or whether and how that inquiry relates to the elements of a patent claim” was not litigated. Life Techs. Corp. v. Promega Corp., 137 S. Ct. 734, 738 (2017).

92. *See, e.g.*, ‘984 Patent at col. 11 *l.* 50–55. The user provides the subject’s DNA sample in step (a), the kit enables steps (b)–(c), but steps (d)–(e) require additional physical steps and analysis. *Id.*

93. *Promega*, 773 F.3d at 1343.

94. Brief for Respondent at 5, *Life Techs.*, 137 S. Ct. 734 (No. 14-1538).

95. *See* Promega Corp. v. Life Techs. Corp., No. 10-cv-281-bbc, 2011 U.S. Dist. LEXIS 154448, at *4 (W.D. Wis. Feb. 16, 2011); U.S. Patent No. RE37,984 is assigned to Max-

Tech were both licensees.⁹⁶ Their dispute was a contract dispute regarding which fields of use were authorized by various licenses,⁹⁷ not “the right of American companies to compete with an American patent holder in foreign markets.”⁹⁸

Promega argued that liability should attach to Life Tech’s worldwide sales under § 271(f)(1) because it supplied a single component, *Taq*, from the United States, even though the kits were

Planck-Gesellschaft zur Förderung der Wissenschaften E.V. (“Max-Planck”), who was joined as an involuntary plaintiff. The German patent owner unequivocally wanted no part in the infringement suit and was joined as an involuntary plaintiff. *Promega Corp. v. Life Techs. Corp.*, No. 10-cv-281-bbc, 2011 U.S. Dist. LEXIS 154448, at *1 (W.D. Wisc. Feb. 17, 2011); U.S. Patent No. RE37,984 (filed June 9, 2000) (reissued Feb. 11, 2003).

96. Max-Planck granted an exclusive worldwide license to Research Genetics, Inc. for its genetic identification technology, which was covered by patents in Germany, Europe, and Japan, and the United States (the Tautz patent). *See Promega Corp. v. Life Techs. Corp.*, 674 F.3d 1352, 1354 (Fed. Cir. 2012). In 1996, Research Genetics licensed to Promega, who was given exclusive rights in the forensics and clinical fields, but non-exclusive rights in other fields. *Id.* Promega had the right to sublicense and did sublicense to Applied Biosystems, LLC (“AB”). *Id.* In 2001, Research Genetics merged into its parent company, Invitrogen, and assigned its rights under the ‘96 agreement. *Id.* In 2003, Invitrogen assigned those rights to IP Holdings, Inc. (“IP”), its wholly owned subsidiary. *Id.* In 2008, Invitrogen and AB merged and became known as Life Technologies Corporation. *Promega*, 674 F.3d at 1354. “IP Holdings remained a wholly owned subsidiary of [Life Tech].” *Id.* Life Tech contacted Promega regarding what they determined was an underpayment of royalties on Promega’s sub-licensees’ sales. *Id.* The dispute quickly escalated. *See id.* Promega filed an infringement suit, alleging infringement of not only the Tautz patent, but four of its own, as well as various claims arising from the 1996 agreement and a 2006 cross-licensing agreement that resulted from a settlement of a prior legal dispute. *Id.* *Promega*, 773 F.3d at 1344. At the outset of litigation, the issue of the assignment of the 1996 agreement was disputed, and it was concluded that IP Holdings, not Life Tech, was the assignee. *Promega*, 2011 WL 9374266, at *4. Life Tech demanded arbitration regarding the payment of royalties under the ‘96 agreement, which was ultimately granted. *Id.* at *2, *6. The remainder of the claims went to trial and litigation proceeded. *Promega Corp. v. Life Techs. Corp.*, No. 10-cv-281-bbc, 2011 U.S. Dist. LEXIS 158561, at *35 (W.D. Wis. Nov. 29, 2011). Life Tech challenged the validity of Promega’s patents as an affirmative defense, but never challenged the Tautz patent. *Promega*, 773 F.3d at 1344 (citing *Promega Corp. v. Life Techs. Corp.*, No. 10-cv-281-bbc, 2011 U.S. Dist. LEXIS 158561, at *30–32 (W.D. Wisc. Nov. 29, 2011)). IP remained a wholly owned subsidiary of Life Tech and retained the ‘96 agreement rights in the Tautz patent, which it did not assign to Life Tech. *Promega*, 674 F.3d at 1354. Ultimately, Promega’s patents were invalidated, and the infringement claims rested solely on the Tautz patent. *Promega*, 773 F.3d at 1358. Presumably, IP holdings could have licensed rights in the non-human genetic identity and clinical markets to Life Tech. Life Tech did argue that it had broader rights under the 1996 agreement. *Id.* at 1358 n.16 (citing Defendant-Appellants’ Reply Brief and Cross Appeal Response at 7–8, *Promega*, 773 F.3d 1338 (Nos. 2013-1011, -1029, -1376)). The court dismissed the argument as untimely. *Id.* at 1341, 1358.

97. *See supra* note 96 and accompanying text.

98. *See DeepSouth Packing Co. v. Laitram Corp.*, 406 U.S. 518, 531 (1972), *superseded by statute*, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383.

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assembled in the United Kingdom.⁹⁹ Thus, every kit sold for use outside of the licensed field, regardless of where it was assembled or sold, would be an infringing “United States [sale].”¹⁰⁰ The jury found all of Life Tech’s sales to be “United States sales” (i.e., infringing sales) and awarded Promega \$52 million in damages for sales that were outside the authorized field of use.¹⁰¹

However, the district court set aside that verdict, finding that Life Tech did not infringe under § 271(f)(1) as a matter of law because: (1) a “substantial portion of the components” must be more than one, and (2) when Life Tech shipped the components to itself, it did not actively induce a third party to infringe.¹⁰² On appeal, the Federal Circuit reversed, finding that the jury had sufficient evidence to find infringement under both § 271(a) (i.e., direct infringement based on U.S. sales) and § 271(f)(1).¹⁰³

99. *See* *Promega Corp. v. Life Techs. Corp.*, 875 F.3d 651, 656 (2017). Although Promega had proposed a § 271(f)(2) jury instruction prior to trial, the issue of instructing the jury on § 271(f)(1) was not raised until the day before trial. Transcript of Hearing for Plaintiff Promega Corporation’s Motion for Directed Verdict at 9–10, *Promega Corp. v. Life Techs. Corp.*, No. 10-cv-281-bbc, 2012 U.S. Dist. LEXIS 190681 (W.D. Wis. Sept. 13, 2012); Post-Trial Jury Instructions at 4, *Promega*, 2012 U.S. Dist. LEXIS 190681, at *1 (No. 10-cv-281-bbc). The jury was ultimately instructed on § 271(a) and (f)(1). *See Promega*, U.S. Dist. LEXIS 190681, at *6. Promega did not assert infringement under § 271(f) because *Taq* is a commodity/staple article. *See Promega*, 773 F.3d at 1354 n.14 (quoting 35 U.S.C. § 271(f)(2) (2012)) (citing Joint Appendix 6289, *Promega*, 773 F.3d 1338 (Nos. 2013-1011, -1029, -1376)).

100. *See* Post-Trial Jury Instructions, *supra* note 99 (“‘United States sales’ include all kits made, used, offered for sale, sold within the United States or imported into the United States, as well as kits made outside the United States where a substantial portion of the components are supplied from the United States.”).

101. *See* Reading of the Verdict at 1, *Promega*, 2012 U.S. Dist. LEXIS 190681, at *1 (No. 10-cv-281-bbc). The jury was instructed: Question No. 2 asks you to determine the total dollar value of the defendants’ United States sales of STR kits. Post-Trial Jury Instructions, *supra* note 99. It reads: “What is the total dollar amount of defendants’ sales of STR kits that were United States sales as that term has been defined for you in the instructions?” Reading of the Verdict at 1–2. Promega urged the jury to find eighty percent of Life Tech’s sales to be infringing at \$141 million in lost profits. *See* Plaintiffs Promega Corporation and Max-Planck-Gesellschaft zur Forderung der Wissenschaften E.V.’s Closing Statement, *Promega*, 2012 U.S. Dist. LEXIS 190681, at *1 (No. 10-cv-281-bbc). Life Tech urged the jury that there had been no damages. *See* Defendant Life Technologies Corporation et al.’s Closing Statement and Plaintiffs’ Rebuttal, *Promega*, 2012 U.S. Dist. LEXIS 190681, at *1 (No. 10-cv-281-bbc).

102. *See Promega*, 2012 U.S. Dist. LEXIS 190681, at *18–19, *29.

103. *Promega*, 773 F.3d at 1344, 1357–58. However, the court also found Promega’s four patents invalid. *Id.* at 1358 (citing 35 U.S.C. § 112 (2012)). Thus, the jury’s award was vacated, and the case was remanded to determine damages based on infringement of the Tautz patent alone. *Id.*

C. The Supreme Court Weighs In

The Supreme Court “granted certiorari to determine whether a party that supplies a single component of a multicomponent invention for manufacture abroad can be held liable for infringement under § 271(f)(1).”¹⁰⁴ The Court concluded that § 271(f)(1) relates to the quantity of multiple components, but that § 271(f)(2) relates to the quality of a single component.¹⁰⁵ Without setting forth a test for determining how to identify components, or what constitutes a “substantial portion,” the Court held that one component was never enough for liability to attach under § 271(f)(1) and the case was remanded.¹⁰⁶ The Court reasoned that this quantitative approach provided the most administrable construction, pointing out that neither Promega nor the Federal Circuit had offered an easy way for market participants to make accurate assessments of liability risk, or for courts to determine whether liability should attach.¹⁰⁷

IV. PROMOTING PROGRESS IN THE USEFUL ARTS

A common refrain is that the United States must strengthen patent protection to protect U.S. businesses. This was the sentiment that brought *Deepsouth* forward as an example of the “Mickey Mouse” nature of U.S. patent laws.¹⁰⁸ Yet, the Constitution seems to impose the limitation that whatever level of patent protection Congress chooses to give must ultimately promote progress in the useful arts, not necessarily protect U.S. businesses or strengthen U.S. patents.¹⁰⁹ In the United States, where

104. *Life Techs. Corp. v. Promega Corp.*, 137 S. Ct. 734, 737 (2017) (citing *Life Techs. v. Promega Corp.*, 136 S. Ct. 2505, 2505 (2016)).

105. *Id.* at 743 (quoting 35 U.S.C. § 271(f)(1) (2012)).

106. *See id.* (quoting 35 U.S.C. § 271(f)(1)). Life Tech did sell some infringing kits in the U.S., but on remand, the Federal Circuit affirmed that Promega had waived any argument for recovery based on a subset of total worldwide sales by not presenting evidence on which the jury could have relied to determine that amount. *Promega Corp. v. Life Techs. Corp.*, 875 F.3d 651, 655, 663 (Fed. Cir. 2017) (first citing 35 U.S.C. § 271(a), (f)(1); and then citing *Promega*, 773 F.3d at 1357). Promega was denied a new trial and walked away empty handed, footing its own legal bills. *See id.* at 666.

107. *Id.* at 741.

108. *See* 119 CONG. REC. 15178–80 (1973) (statement of Sen. McClellan).

109. A threshold question, then, is what is progress in the useful arts? *See generally* Malla Pollack, *What is Congress Supposed to Promote?: Defining “Progress” in Article I, Section 8, Clause 8 of the United States Constitution, or Introducing the Progress Clause*, 80 NEB. L. REV. 754 (2001) (discussing the meaning of “progress” in Article I, Section 8, Clause 8 of the U.S. Constitution). The Supreme Court has not yet interpreted the term, yet has treated “advancement” and “advances” as synonymous with “progress.” Edward C. Walterscheid, *Divergent Evolution of the Patent Power and the Copyright Power*, 9 MARQ. INTELL. PROP. L. REV. 307, 318 (2005). It is also unclear whether “progress” must be maximized domestically or in general. *See id.* at 317.

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patent law is driven by the utilitarian framework,¹¹⁰ wealth and utility-maximization (e.g., economic quantity improvement) are used as proxies for progress.¹¹¹

If we accept domestic wealth and utility-maximization as proxies for progress, then the question becomes: Does § 271(f)—providing any U.S. patent holder, either domestic or foreign, a cause of action against a U.S. supplier of components of their patented invention—maximize wealth and utility? Under this rubric, § 271(f) seems to fail.

A. 35 U.S.C. § 271(f) Is Not Promoting Progress in the Useful Arts

Courts can interpret uncertain laws with “surgical accuracy” to address one problem without creating others.¹¹² Yet, with respect to § 271(f), the courts have lopped off entire broad categories of liability, a response that was likely necessary due to the statute’s vagueness and overbreadth. Thus, after three decades of judicial interpretation, we still do not have a workable test to determine what a “component” is or what constitutes a “substantial portion” of those components.¹¹³ As discussed later, § 271(f) was likely unnecessary for promoting progress even at the time *Deepsouth* was decided. Subsequent changes in manufacturing and trade practices have rendered it an impediment to progress. It is time to consider repealing the statute.

1. The Federal Circuit’s Qualitative Approach

The Federal Circuit adopted a qualitative approach to determining what constitutes a “substantial portion of the components,” and held that a “single important or essential component can be a ‘substantial portion of the components’ of a patented invention.”¹¹⁴ Under that test, *Taq*

110. The U.S. patent system operates by granting a right to seek government enforcement in excluding unauthorized users from making, using, selling, offering for sale in the United States, or importing into the United States a patented invention. 35 U.S.C. § 271(a). Because intellectual property is a nonrival good (as opposed to tangible property, a rival good which only a finite number of people can use), in the short-term this exclusive right is likely to diminish social welfare. KEITH E. MASKUS, *PRIVATE RIGHTS AND PUBLIC PROBLEMS: THE GLOBAL ECONOMICS OF INTELLECTUAL PROPERTY IN THE 21ST CENTURY* 6 (2012). However, this short-term inefficiency may be necessary to allow inventors to appropriate a return on their investment sufficient to incentivize innovation. *Id.* at 6.

111. See Margaret Chon, *Intellectual Property and the Development Divide*, 27 *CARDOZO L. REV.* 2821, 2824–25 (2006).

112. Keith N. Hylton, *Patent Uncertainty: Toward a Framework with Applications*, 96 *B.U.L. REV.* 1117, 1147 (2016).

113. See discussion *supra* Section II.C–D.

114. *Promega Corp. v. Life Techs. Corp.*, 773 F.3d 1338, 1353 (Fed. Cir. 2014) (quoting 35 U.S.C. § 271(f)(1)).

polymerase, “a staple article,”¹¹⁵ was found to be “a substantial proportion of the components.”¹¹⁶ The court reasoned that without it “the genetic testing kit recited in the Tautz patent would be inoperable because no PCR could occur.”¹¹⁷

Because each element of a claim limitation (and therefore each component) is, by nature, essential to the invention, this test is so broad that it encompasses the supply of any single component of a combination patent.¹¹⁸ The component may be required to make the invention work. It may be required to differentiate the invention from the prior art. Whatever the reason, if a component is claimed, it is essential to the invention. Congress’s intent was certainly not for liability to attach to every single component of a combination patent claim.¹¹⁹

Promega, of course, supported the Federal Circuit’s approach, and

115. *Id.* at 1354 n.14 (quoting 35 U.S.C. § 271(f)(2)) (citing Joint Appendix, *supra* note 99).

116. *Id.* at 1356.

117. *Id.* Certainly, the STR *method* would be inoperable without PCR, and therefore, without a polymerase enzyme. Yet, it is unclear what an “operable” *kit* would be. The kit does not even contain all the equipment and reagents required to analyze the length polymorphisms, it only contains the reagents to carry out the PCR—a technology that is as ubiquitous in molecular biology as the internet. *See supra* Section III.A.

118. *Cf.* Aro Mfg. Co. v. Convertible Top Replacement Co., 365 U.S. 336, 345 (1961) (“[T]here is no legally recognizable or protected ‘essential’ element, ‘gist’ or ‘heart’ of the invention in a combination patent.”); *see also* 5 DONALD S. CHISUM, CHISUM ON PATENTS § 17.03 (2017).

If the item is a part of the invention and meets the other requirements of Section 271(c) (i.e., “especially made or especially adapted for use in an infringement” and “not a staple article or commodity of commerce suitable for substantial noninfringing use”), then it will almost inevitably constitute a “material” part of the invention. There is no indication that the component must be the “point of novelty,” “heart,” or “essential” element of the invention.

Id. But *see* Neil M. Zipkin, *Infringement and Assembly Abroad—Patent Protection Takes a Vacation in Deepsouth*, 47 ST. JOHN’S L. REV. 662, 681 (1973) (discussing “[t]he judicial restoration of the essential element doctrine” in *Aro Mfg. Co. v. Convertible Top Replacement Co.* (Aro II), 377 U.S. 476 (1964)). *Aro II*, however, was decided under § 271(c), and liability was predicated on the fact that the component was “especially made” and had “hardly . . . any noninfringing use.” 377 U.S. at 487–88; *see* 35 U.S.C. § 271(c). The issues of essentiality and special adaptation are distinct. *See* discussion *infra* Section IV.B.

119. *See supra* Part II. Here, predicating liability on the supply of *Taq* polymerase for any kit containing PCR reagents could have a massive innovation stifling impact. Though far from a perfect proxy, a patent search for issued patents whose claims included both the term “kit” and the term “polymerase” yielded 1,609 results, representing over four percent of the 39,737 patents in the database (those issued since 1976) whose claims include the term “kit.” *USPTO Patent Full-Text and Image Database*, USPTO, <http://patft.uspto.gov/netahtml/PTO/searchbool.html> (last visited Dec. 30, 2018).

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tried to soothe concerns that the floodgates of litigation would open if liability could be predicated on supplying a single component.¹²⁰ It reasoned that a concession by Life Tech’s expert witness that *Taq* was a “main and major” component of the STR kits made the case exceptional and unique.¹²¹ Yet, this is not much of a comfort because every claimed component is “essential,” as described earlier in this Section, and thus under the Federal Circuit’s test, every supplier of a component of a patented invention (commodity or not) could be subject to liability when the combination patent is assembled overseas.¹²²

The potential for attaching liability to the supply of a single commodity component caused Life Tech and its amici concerns regarding, *inter alia*, disruptions in the supply chain, conflicts of law, loss of U.S. jobs, and harm to the U.S. economy.¹²³ Allowing liability to attach to the supply of unpatented components of an invention would require businesses to account for potentially devastating liability for worldwide sales of staple commodity items.¹²⁴ That sort of uncertainty could very likely drive manufacturers overseas.¹²⁵ Furthermore, because injunctions could cause disruptions in U.S. supply, foreign companies

120. Brief in Opposition at 1–2, *Life Techs. Corp. v. Promega Corp.*, 137 S. Ct. 734 (2017) (No. 14-1538).

121. Brief in Opposition, *supra* note 120, at 1.

122. *Promega Corp. v. Life Techs. Corp.*, 773 F.3d 1338, 1353 (Fed. Cir. 2014) (quoting 35 U.S.C. § 271(f)(1)). Section 271(f)(1) also has an “active inducement” requirement and § 271(f)(2) also has a “knowing” and “intending” element. *Life Techs.*, 137 S. Ct. at 742 n.8. The Supreme Court has not weighed in on these requirements. *See id.* *Promega* argues that § 271(f)(1) requires knowledge of the patent, and that the knowledge requirement should also allay concerns about the floodgates of litigation. *See* Brief in Opposition, *supra* note 120. However, patent owners would simply have to mail notice to component suppliers in order to overcome this hurdle. *See* Reply Brief for Petitioners at 10, *Life Techs.*, 137 S. Ct. 734 (No. 14-1538).

123. *See* Brief for Petitioners at 5, *Life Techs.*, 137 S. Ct. 734 (No. 14-1538); Reply Brief for Petitioners, *supra* note 122, at 2; Brief of Amicus Curiae Agilent Technologies, Inc. in Support of Petitioners at 4, *Life Techs.*, 137 S. Ct. 734 (No. 14-1538); Brief of Bundesverband Der Deutschen Industrie E.V., Deutscher Industrie-Und Handelskammertag E.V., Henning Grosse Ruse-Khan, and Paul L.C. Torremans as Amici Curiae in Support of Petitioners at 4, *Life Techs.*, 137 S. Ct. 734 (No. 14-1538); Brief Amicus Curiae of Intellectual Property Professors in Support of Petitioners at 1, *Life Techs.*, 137 S. Ct. 734 (No. 14-1538); Brief for the United States as Amicus Curiae Supporting Petitioners at 1, *Life Techs.*, 137 S. Ct. 734 (No. 14-1538); Petition for a Writ of Certiorari at 28, *Life Techs.*, 137 S. Ct. 734 (No. 14-1538).

124. *See* Reply Brief for Petitioners, *supra* note 122, at 13; *see also* *WesternGeco LLC v. ION Geophysical Corp.*, 138 S. Ct. 2129, 2134 (2018) (holding that if infringement is found under § 271(f)(2), the remedy can include foreign lost profits); *see also infra* note 171.

125. *See generally* Keith N. Hylton, *Patent Uncertainty: Toward a Framework with Applications*, 96 B.U. L. REV. 1117 (2016) (discussing patent uncertainty).

may choose not to do business with U.S. suppliers.¹²⁶ The Supreme Court acknowledged these concerns, and ruled in favor of Life Tech, holding that a “substantial portion” is at least “more than one.”¹²⁷

2. *The Supreme Court’s Quantitative Approach: The Lesser of Two Evils?*

Although it relied heavily on a textual analysis to reach its conclusion,¹²⁸ the Court recognized that from a practical standpoint the flexibility of the Federal Circuit’s test would be un-administrable.¹²⁹ Although the Supreme Court’s “more than one” test, bright-line on its face, seems antithetical to the Court’s pattern of more flexible standards,¹³⁰ closer inspection reveals that this test is also flexible and ambiguous. What are components? How many components are substantial? Two? More than two? Is “substantial” measured as the number of components supplied without regard to how many components are in the invention? As the ratio of components supplied to the number of components? And so on.

The Court’s “not one” rule avoided a situation where every supplier of a single commodity item could be on the hook for infringement of a combination patent. Yet, how should the U.S. supplier who ships two commodity items react to this decision? How should it assess its liability risks under § 271(f)? Are the risks large enough that they will pack up and leave? Will foreign business partners avoid doing business with U.S. manufacturers and suppliers? The decision leaves substantial uncertainty.

B. *Can 35 U.S.C. § 271(f) Be Salvaged?*

In support of the Federal Circuit’s qualitative approach, one author suggests that “a substantial portion of the components of a patented invention” in § 271(f)(1) is better interpreted as “a material portion of the components . . . especially adapted for use in the patented device.”¹³¹ The proposed revision would result in both § 271(f)(1) and (f)(2) being interpreted qualitatively when less than “all” of the components are

126. See Petition for a Writ of Certiorari, *supra* note 123, at 4–5.

127. See *Life Techs.*, 137 S. Ct. at 741–42.

128. See *id.* at 739 (citing *Sebelius v. Cloer*, 569 U.S. 369, 376 (2013)).

129. See *id.* at 741.

130. See Powell, *supra* note 82, at 165, 172.

131. Christopher Ainscough, *Content: Deepsouth Will Rise Again—The Argument in Favor of the Federal Circuit’s Holding in Promega Corp. v. Life Technologies*, 12 WASH. J.L. TECH. & ARTS 159, 174, 187–88 (2017) (acknowledging that the plain meaning of “substantial” is “quantity,” Ainscough suggests the use of “material,” which “addresses the substance of the invention”).

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supplied. However, § 271(f)(1), unlike (f)(2), would apply to both commodity/staple components and non-commodity components.¹³² If a commodity component was material, it would also have to be “especially adapted” for liability to attach to its supply.¹³³

Whether a component is “material” is just as illusory as whether it is “essential.”¹³⁴ Thus, liability under the proposed test, for both § 271(f)(1) and (f)(2), would turn only on whether a component was “especially adapted.”¹³⁵ As a result, the quantity of components would presumably only be implicated under § 271(f)(1) when “all” of the components are supplied. That result is contrary to both the Federal Circuit and Supreme Court interpretations of the interplay between § 271(f)(1) and (f)(2),¹³⁶ and to Congressional intent.¹³⁷ Furthermore, the

132. *See id.* at 174.

133. *See id.* at 175–79. Applying this test, the author finds all five of the STR kit’s components to be material, but only the primers and potentially the *Taq*, buffer, and template DNA to be “especially adapted.” *See id.* The primers are considered material because they are “essential,” required for the invention to work, and they get at the “very heart of the claimed invention.” *Id.* at 176. The *Taq*, buffer, and dNTPs are considered material because they are required for the invention to work. Ainscough, *supra* note 131, at 176–78. The template DNA is simply stated to be “certainly material to the kit.” *Id.* at 178. The primers are considered especially adapted because they “mark the beginning and ends of the STRs, whose successful combination is a laborious trial-and-error effort.” *Id.* at 126. The dNTPs are not considered especially adapted because “nucleotides are present in every living organism known to science and were not especially adapted for the kit.” *Id.* at 178. Whether the *Taq*, buffer, or template DNA are especially adapted would be an issue of fact. *Id.* at 176–78.

134. *See Life Techs.*, 137 S. Ct. at 739–41 (citing WEBSTER’S THIRD NEW INTERNATIONAL DICTIONARY OF THE ENGLISH LANGUAGE UNABRIDGED 2280 (Philip Babcock Gove et al. eds., 1981)).

135. 35 U.S.C. § 271(f) (2012); *Life Techs.*, 137 S. Ct. at 741–42. But § 271(f)(1) also has an “active inducement” requirement, and § 271(f)(2) also has a “knowing” and “intending” element. *See supra* note 122 and accompanying text.

136. *See Life Techs.*, 137 S. Ct. at 742 (quoting 35 U.S.C. § 271(f)); *Promega Corp. v. Life Techs. Corp.*, 773 F.3d 1338, 1354 (2014) (quoting 35 U.S.C. § 271(f)).

137. 130 CONG. REC. 28,069 (1984).

Under paragraph (f)(1) the components may be staple articles or commodities of commerce which are also suitable for substantial non-infringing use, but under paragraph (f)(2) the components must be especially made or adapted for use in the invention. The passage in paragraph (f)(2) reading “especially 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 section 271(c) of the patent law, which governs contributory infringement. Paragraph (f)(2), like existing subsection 271(c), requires the infringers to have knowledge that the component is especially made or adopted. Paragraph (f)(2) also contains a further requirement that infringers must have an intent that the components will be combined outside of the United States in a manner that would infringe if the combination occurred within the United States.

proposal widens the jaws of § 271(f) liability even further, “protect[ing] a patent holder from having the *key pieces* of its inventions shipped overseas for infringing purposes . . .” and providing a “useful tool” for patent holders.¹³⁸ Certainly expanding the scope of patent infringement is a “useful tool” for patent holders, but “useful tools” for patent holders do not necessarily promote progress.

C. Should Deepsouth Rise Again?

The reaction to the perceived inequity of *Deepsouth* was strong.¹³⁹ Indeed, *Deepsouth*’s maneuvers understandably elicited feelings of unfairness, especially after long and drawn out litigation. Yet, the correct Congressional response is not necessarily the one that seems equitable, it is one that promotes progress.¹⁴⁰ *Deepsouth* did not weaken Laitram’s U.S. patent rights—it never had the right to exclude others from making, using, or selling anything less than its patented invention (within the United States).¹⁴¹ It used those rights effectively to exclude *Deepsouth* from most of the existing market.¹⁴²

Nevertheless, Laitram’s attorney set forth the following parade of horrors that would result from the *Deepsouth* decision: (1) U.S. patent protection for exported combination patents would be emasculated; (2) individual inventors and small business would have difficulty in obtaining meaningful patent protection given the costs of filing in foreign countries; (3) discrimination would arise between inventors of large machines that would be impossible to assemble at the place of manufacture on the one hand, and small appliances on the other; (4) U.S. patentees would be required to bring infringement actions against foreign customers rather than competing manufacturers; (5) recovery would be rendered impossible if the “evader” is a U.S. company with no place of business in any foreign jurisdiction; (6) the results of infringement suits in foreign jurisdictions would be uncertain; and (7) patent owners would now need to know that the last screw on an infringing item will be tightened within the United States to bring an infringement suit—adding a “knowledge” requirement to contributory infringement (referencing shipment of “knocked-down” doll houses and coaster wagons).¹⁴³

Id.

138. See Ainscough, *supra* note 131, at 179–80 (emphasis added).

139. See *supra* Section II.A.

140. See U.S. CONST. art. I, § 8, cl. 8.

141. See 35 U.S.C. § 271(a)–(c).

142. See *Deepsouth Packing Co. v. Laitram Corp.*, 406 U.S. 518, 523 (1972), *superseded by statute*, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383.

143. *Patent Hearings*, *supra* note 60.

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However, these horribles all presumably flowed from the “operable assembly” rule, which had garnered strong opposition from the academic

community,¹⁴⁴ but which nevertheless remains intact today.¹⁴⁵ Two

144. *Id.* at 689. Shoup's statement included references to ten law review articles; five that were published following the Fifth Circuit's ruling, and five published following the Supreme Court's ruling. *Id.*; see Stephen R. Anderton, *Patent Infringement—Patents*, 35 U.S.C. 271(a)—*When All Parts of Patented Machine Are Produced in United States, with Minor Final Assembly in A Foreign Country, that Machine Is “Made” Within United States Under Section 271(a)*. *Laitram Corp. v. Deepsouth Packing Co.*, 443 F.2d 936 (5th Cir. 1971), 3 TEX. TECH L. REV. 216, 218 (1971) (supporting the Fifth Circuit's decision and arguing that it would result in the court not having to worry about whether there was “making” under the facts of the *Deepsouth*, or the precedent relied upon by the trial court); John C. Baldwin, *Exports and Patent Infringement: The Test of Manufacture “Within the United States”*, 29 WASH. & LEE L. REV. 173, 180–81 (1972) (arguing that operable assembly will promote competition and benefit the public good, whereas substantial assembly “places undue emphasis upon the patent holder's reward”); Steven E. Lipman, *Deepsouth Packing Co. v. Laitram Corp.—How to Succeed in Deceiving Without Really Trying*, 54 J. PAT. OFF. SOC'Y 695, 703–04 (1972) (criticizing the Supreme Court decision and the precedent it relied on, but distinguishing *Deepsouth* on its facts—specifically that there was manufacturing of all of the elements of the combination, finding it unlikely that there was never assembly even for testing purposes); Edgar R. Norwood, *A Combination is Made Pursuant to 35 U.S.C. 271(a) if All the Elements of the Patented Combination are Produced in the United States and All that is Required to Transform These Elements into the Completed Combination is a Relatively Simple Assembly of Those Elements*, 9 HOUS. L. REV. 379, 384 (1971) (concluding that the substantial assembly rule would be more difficult to apply, but advances the policies of protecting the inventor, whereas the operable assembly rule protects only the public's interest in using the component elements); *Patent Law—Infringement of a Combination Patent—A Patented Machine Whose Parts Are Produced in the United States Is Not “Made” Within the United States Within the Meaning of Section 271(a) of the Patent Act if Its Component Parts Are Exported in Unassembled Form*, 26 VAND. L. REV. 201, 206 (1973) (preferring the substantial assembly rule and expressing concerns that operational assembly did not promote progress because it deprived the patent owner of foreign markets, and that patent owners would bear high costs of obtaining and defending foreign patents); *Patent Law—Sale of Partially Assembled Components of a Patented Device for Final Assembly in a Foreign Country Does Not Infringe Domestic Combination Patent*, 41 FORDHAM L. REV. 458, 467–69 (1972) (preferring a subjective test, pointing out that the doctrine of equivalents allows for infringement based on a substantially similar test, and discussing the difficulty in obtaining and enforcing foreign patent protection); *Patents—Infringement—A Patented Machine Is “Made” within the United States When All of Its Parts Are Produced Domestically and the Machine Is Substantially Assembled in the United States Prior to Final Assembly in a Foreign Country*. *Laitram Corp. v. Deepsouth Packing Co.*, 443 F.2d 936 (5th Cir. 1971), 7 TEX. INT'L L. J. 325, 327–29 (1972) (arguing that the only alternatives to the balancing test offered by the Fifth Circuit were expanding contributory infringement or expanding direct infringement, finding both alternatives unworkable, and supporting the balancing test); *Patents—Supreme Court Narrowly Construes § 271(a) of Patent Code and Holds that Export of Components Does Not Violate Combination Patent*. *Deepsouth Packing Co. v. Laitram Corp.*, 92 S. Ct. 1700 (1972), 10 HOUS. L. REV. 216, 218 (1972) (discussing the restriction to the domestic market for combination patents when a “minor or unimportant part” of a combination patent is omitted); James H. Schropp, *Combination Patent Holders Denied Flagship Status: Section 271 of the U.S. Patent Code Construed: Deepsouth Packing Co v. Laitram Corp (U.S. 1972)*, 5 LAW & POL'Y INT'L BUS. 319, 330 (1973) (arguing that limiting patent protection to domestic markets promotes the free flow of goods in international trade, promoting competition); *Tightening the Screws on Minor Assembles Abroad: The Meaning of “Makes”*

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proposals for corrective legislation surfaced in the academic literature following *Deepsouth*, both of which predicated liability (for making, selling, or manufacturing) on the level of assembly achieved.¹⁴⁶ These proposals were suggestions to overturn *Deepsouth*'s "operable assembly" holding and instead codify a version of "substantial assembly." The bills introduced during the 93rd and 94th Congress also focused on the level of assembly—predicating liability on making or selling "all" or "substantially all" of the components.¹⁴⁷ In contrast, the bills introduced in the 98th Congress did not predicate liability on making (or selling or manufacturing). Rather, they predicated liability on "supplying or causing to be supplied."¹⁴⁸ Furthermore, despite the academic community's focus on the interpretation of "making," the Supreme Court in *Deepsouth*—even while adopting "operable assembly"—also focused on the issue of extraterritoriality.¹⁴⁹

Extraterritoriality remains relevant, and the Supreme Court has articulated several justifications for applying the presumption against extraterritoriality and limiting the reach of U.S. patent laws.¹⁵⁰ It (1) avoids overloading courts with complex cases involving foreign activity, (2) incentivizes U.S. based companies with extra liability exposure to

Under the Patent Infringement Statute, 57 IOWA L. REV. 889, 896 (1972) (supporting the Fifth Circuit's decision, and arguing that the policy of making components available to the public was irrelevant because *Deepsouth* manufactured the entire machine).

145. See 35 U.S.C. § 271(f). Predicating liability under § 271(f) on supplying, rather than making, left *Deepsouth*'s "operable assembly" holding intact. *Deepsouth*, 406 U.S. at 528.

146. See Charles M. Kerr, *Operable Versus Substantial Assembly of Patented Combinations: A Critique of Deepsouth v. Laitram*, 26 STAN. L. REV. 893, 919 (1974) ("Whoever, for export and without authority, knowingly makes and/or sells, within the United States and for use in a foreign country, but for minor final assembly and/or minor parts, any patented combination during the term of the patent therefor, infringes the patent."); Zipkin, *supra* note 118, at 663–64 ("Whoever shall substantially manufacture in the United States so much of the unpatented elements of a patented combination that the patentable aspect of that combination is captured, and there exists no significant practical use for such manufactured item(s) other than assembly into the patented combination, and such assembly, requiring only minor integration, does in fact take place abroad, shall be liable as a direct infringer.").

147. See S. 2255, 94th Cong. § 271(f) (1975); S. 473, 94th Cong. § 271(e) (1975); S. 23, 94th Cong. § 271(f) (1975); S. 2504, 93d Cong. § 271(f) (1973).

148. See S. 1535, 98th Cong. § 271(f) (1983). Predicating liability on supplying rather than making could have been in response to the Houston Patent Law Association's recommendation. See *Innovation and Patent Law Reform: Hearings Before the Subcomm. on Courts, Civil Liberties, and the Admin. of Justice of the Comm. on the Judiciary on H.R. 3285, H.R. 3286, and H.R. 3605*, 98th Cong. 2890–92 (1984).

149. See *Deepsouth*, 406 U.S. at 531; see also *supra* Section I.C.3.

150. See Michael Brody et al., *Extraterritorial Application of U.S. Patent Laws*, 18 SEDONA CONF. J. 187, 188 (2017). See generally Holbrook, *supra* note 10 (providing an in-depth discussion of the presumption against extraterritoriality as it relates to intellectual property).

move operations overseas, (3) reduces uncertainty about whether conduct will create liability, and (4) avoids damage to foreign relations and unfairness to litigants.¹⁵¹

Yet, several rationales would seem to support allowing U.S. patent laws to apply extraterritorially.¹⁵² First, if more cases are heard in the United States, the United States will have a larger role in dictating the course of intellectual property protection worldwide.¹⁵³ Second, invention and innovation may be promoted.¹⁵⁴ For example, extraterritorial reach could incentivize inventors to invent processes that could otherwise easily escape liability when certain steps are practiced outside the United States (or, analogously, when multi-component inventions are assembled overseas).¹⁵⁵ Third, conflicts of law may not exist if/when global intellectual property laws are harmonized.¹⁵⁶ While expanding liability in any manner supports the first rationale, such expansion may, depending on the scope and direction of that expansion, either support or undermine the others.

Despite the fact that § 271(f)'s extraterritorial reach may incentivize inventors to invent certain types of inventions, the remaining uncertainty regarding manufacturers' exposure to liability when engaged in the global supply chain likely provides more incentive to move overseas, cutting against the utility of § 271(f)'s extraterritorial reach.¹⁵⁷ This sort of global supply chain management concern was not an issue when *Deepsouth* was decided nor when § 271(f) was passed; therefore, it is even more important to reconsider the law now. Moreover, expansive liability under § 271(f) could incentivize foreign manufacturers to leverage U.S. component patents to exclude competitors from the market. For example, a foreign manufacturer could obtain U.S. patents claiming components produced by competing U.S. manufacturers. They could then leverage those patents to drive business away from their U.S. competitors by creating infringement liability concerns. Finally, while other U.S. patent laws may be in harmony with the rest of the world, § 271(f) is not.¹⁵⁸ For all of these reasons, § 271(f) and its extraterritorial

151. See Brody et al., *supra* note 150, at 204–05.

152. *Id.* at 203.

153. *Id.*

154. *Id.*

155. *Id.* at 204. Divided infringement refers to processes where only a portion of the steps are completed in the U.S. See Melissa Feeney Wasserman, Note, *Divided Infringement: Expanding the Extraterritorial Scope of Patent Law*, 82 N.Y.U. L. REV. 281, 281 (2007).

156. See Brody et al., *supra* note 150, at 204.

157. See discussion *supra* Section IV.A.

158. See Brief of Bundesverband Der Deutschen Industrie E.V., Deutscher Industrie-Und Handelskammertag E.V., Henning Grosse Ruse-Khan, and Paul L.C. Torremans as Amici

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reach is not likely to promote progress, and the advantage of U.S. jurisdictional domination alone cannot carry the day.

Reviving *Deepsouth* would mean the revival of “operable assembly.” Yet, as discussed below, even under the “operable assembly” rule, post-*Deepsouth* developments may provide alternative approaches for inventors of combination inventions to gain more protection from their U.S. patents than was available at the time *Deepsouth* was decided.

1. Alternative Claim Drafting

Many of the horrors of the *Deepsouth* decision can be avoided by embracing alternative claim drafting techniques that have become common since *Deepsouth*.¹⁵⁹ The patented invention in *Deepsouth* was a large, unwieldy piece of machinery, which Laitram admitted that “for practical reasons” must be shipped unassembled.¹⁶⁰ Yet, the patent claims were issued on the machine itself (which was comprised of the various unpatentable components) and not on a kit comprising those components.¹⁶¹ Now, it would be commonplace to draft claims to such a kit in addition to the fully assembled machine.

Laitram argued that *Deepsouth* described the sale as the sale of a machine, not in “kit form,” suggesting that it would agree that *Deepsouth* could have been held liable for direct infringement if their patent claims had been drafted as kit claims.¹⁶² Therefore, a “kit” claim likely could have avoided the “horrors” of obtaining or asserting a foreign patent, suing foreign customers, or finding a proper jurisdiction.¹⁶³ Concerns

Curiae in Support of Petitioners at 11, *Life Techs. Corp. v. Promega Corp.*, 137 S. Ct. 734 (2017) (No. 14-1538).

159. See John R. Thomas, *Of Text, Technique, and the Tangible: Drafting Patent Claims Around Patent Rules*, 17 J. MARSHALL J. COMPUTER & INFO. L. 219, 249 (1998).

160. Brief for the Respondent, *supra* note 54, at 9–10, 23.

161. See U.S. Patent No. 2,825,927 (filed July 8, 1954); U.S. Patent No. 2,694,218 (filed Aug. 19, 1952).

162. Brief for the Respondent, *supra* note 54, at 11. “Kit” claims, common now, were explicitly approved by the CCPA in 1976. *In re Venezia*, 530 F.2d 956, 957–60 (C.C.P.A. 1976); see also Thomas, *supra* note 159. Yet, while the *Venezia* decision came before § 271(f) was enacted, it was decided after Laitram had prosecuted its patents and after the *Deepsouth* decision. Apparently Laitram *did* attempt to get kit-type claims. Brief for the Petitioner, *supra* note 32, at 38 (discussing rejection of claims as a “mere catalog of parts”).

163. Presumably, liability would have attached under the facts of *Deepsouth* if the deceiver had been claimed as a kit. See *Microsoft Corp. v. AT & T Corp.*, 550 U.S. 437, 437 (2007).

Section 271(f) was a direct response to a gap in U.S. patent law revealed by *Deepsouth Packing Co. v. Laitram Corp.*, 406 U.S. 518, 92 S. Ct. 1700, 32 L.Ed.2d 273, where *the items exported were kits* containing all the physical, readily assemblable parts of a machine (not an intangible set of instructions), and those parts themselves (not foreign-made copies of them) would be combined abroad by foreign buyers.”

about the “last screw” being tightened would be abolished—only if that last screw was essential would the patent drafter include it in the claims. Discrimination by size of machinery would be eliminated.

Drafting “kit” claims, however, would not completely remove the possibility of competitors “escaping” liability under § 271(a). While it was clear that Deepsouth had not made a complete and operable assembly of the full *machine*, it remains unclear what would constitute the final, “operable assembly” of a *kit*.¹⁶⁴ Deepsouth made all the components of the machine and sold them to its customer. Yet, it had packed some of the components in separate boxes, which could potentially be construed as less than a final, operable assembly—even of a kit. A narrow view of what constitutes “making” a kit would require all the components to be in the same box and be sold or shipped together. However, because Deepsouth manufactured all the components and delivered them together “free on board” (FOB)¹⁶⁵ (albeit in separate crates), it is very likely that this would have been considered “making,” even under the operable assembly rule, had the deceiver been claimed as a kit.¹⁶⁶ On the other hand, Life Tech clearly would not have “made” the STR kit by supplying only one component.

The emergence of kit claims obviates the need for § 271(f)(1)’s “all . . . components of a patented invention” language.¹⁶⁷ However, the operable assembly rule precludes liability for less than a full assembly. Therefore, without § 271(f), liability would only attach under § 271(a) when all the components are supplied (as a kit). Even so, because the components of combination patents are themselves unpatentable, and because, as described above in Section IV.A.1, kit claims should only include those components which are essential to the invention, the level of protection would seem reciprocal to the contribution of the invention—striking the right balance for promoting progress. While it may be possible that another seemingly inequitable situation like Deepsouth may arise, as discussed above, § 271(f), including § 271(f)(1)’s “substantial portion” language has injected uncertainty and instability into patent law

Id. (emphasis added).

164. As discussed *supra* Section I.C.3, the Supreme Court resolved the circuit split by adopting the narrow “operable assembly” rule over the “substantial assembly” rule.

165. See William J. Stewart, *F.O.B.*, COLLINS DICTIONARY L. (3d ed. 2006), https://search.credoreference.com/content/entry/collinslaw/f_o_b/0 (defining FOB as “‘free on board’, a special arrangement for sale of goods developed by commerce. The buyer insures for the journey as well as paying for the goods and for the freight. The seller pays the cost of having the goods put on the ship.”).

166. *Deepsouth*, 406 U.S. at 524.

167. 35 U.S.C. § 271(f)(1) (2012).

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and is less likely to promote progress than precluding liability for the supply of less than all of the components of a kit.

It is also possible that one of the kit components could be “especially made or especially adapted for use in the invention and not a staple article or commodity of commerce suitable for substantial noninfringing use.”¹⁶⁸ Yet, contributory infringement under § 271(c) would capture the supply of that component within the United States while supply to foreign countries would not trigger liability.¹⁶⁹ For the reasons discussed above, the presumption against territoriality should apply, and patent holders should rely on their foreign patents for foreign protection.¹⁷⁰ Indeed, the Supreme Court recently held that if infringement is found under § 271(f)(2), the remedy can include foreign lost profits,¹⁷¹ potentially creating a springboard for much more expansive liability than would be available under the domestic infringement statute.¹⁷²

168. 35 U.S.C. § 271(f)(2).

169. *See id.*

170. *See WesternGeco LLC v. ION Geophysical Corp.*, 138 S. Ct. 2129, 2139–44 (2018) (Gorsuch J. & Breyer J., dissenting).

171. *See id.* at 2138.

172. *See id.* at 2142 (Gorsuch, J. & Breyer, J., dissenting) (quoting *Microsoft Corp.*, 550 U.S. at 456). Indeed, the Court’s reasoning left open the possibility that lost foreign profits could apply even when the infringement was based solely on domestic acts (e.g., under § 271(a)–(c)). *See id.* at 2138 (quoting *Morrison v. National Australia Bank Ltd.*, 561 U.S. 247, 267 (2010)) (“In sum, the focus of § 284, in a case involving infringement under § 271(f)(2), is on the act of exporting components from the United States. In other words, the domestic infringement is ‘the objec[t] of the statute’s solicitude’ in this context. The conduct in this case that is relevant to that focus clearly occurred in the United States, as it was ION’s domestic act of supplying the components that infringed WesternGeco’s patents. Thus, the lost-profits damages that were awarded to WesternGeco were a domestic application of § 284.”). Although the full impact of *WesternGeco* is not yet readily apparent, lower courts have begun broadly interpreting *WesternGeco*, applying foreign damages calculations to any type of infringement. *See Power Integrations, Inc. v. Fairchild Semiconductor Int’l, Inc.*, No. 04-1371-LPS, 2018 U.S. Dist. LEXIS 171699, at *4 (D. Del. Oct. 4, 2018) (“In the Court’s view, the Supreme Court’s *WesternGeco II* decision implicitly overruled the Federal Circuit’s *Power Integrations* opinion. The Supreme Court’s analysis of the patent damages statute, § 284, has equal applicability to the direct infringement allegations pending here, as governed by § 271(a), as it did to the supplying a component infringement claims at issue in *WesternGeco II*, which were governed by § 271(f).”); *see also Verinata Health, Inc. v. Ariosa Diagnostics, Inc.*, 329 F. Supp. 3d 1070, 1106–07 (N.D. Cal. 2018) (lost profits of foreign subsidiaries was appropriate in damages calculation where all tests carrying out the claimed method were performed in California). The *Power Integrations* court certified their order for interlocutory review by the Court of Appeals for the Federal Circuit. *Power Integrations*, 2018 U.S. Dist. LEXIS 171699, at *8. Damages, of course, must still be predicated on a causal nexus between the lost profits and the infringement. *Verinata Health*, 329 F. Supp. 3d at 1107 (citing *Grain Processing Corp. v. Am. Maize-Prod. Co.*, 185 F.3d 1341, 1349 (Fed. Cir. 1999)).

2. Liability for “Selling” and “Offering to Sell”

Despite any remaining uncertainty regarding what “making” an “operable assembly” of a kit would be, liability might also attach under *Deepsouth*’s facts as an infringing “sale” (either of the completed machine, or a “kit”). Though Laitram did raise the issue of infringing sales to the Supreme Court, the Court dismissed the argument, reasoning that the machine must have been “made” before it could be “sold.”¹⁷³ Yet, it is now clear that the statute requires consideration of “sale” and “making” in the disjunctive.¹⁷⁴ Contrary to the *Deepsouth* Court’s assertion, the Federal Circuit has held that operable assembly is not a predicate to an infringing sale.¹⁷⁵ Furthermore, liability under the direct infringement statute now encompasses when someone either “sells” or “offers to sell” a patented invention.¹⁷⁶

173. *Deepsouth*, 406 U.S. 518 at 529 (quoting *Radio Corp. of Am. v. Andrea*, 79 F.2d 626, 628 (2d Cir. 1935)) (first citing *Cold Metal Process Co. v. United Eng’g & Foundry Co.*, 235 F.2d 224, 230 (3d Cir. 1956); and then citing *Hewitt-Robins, Inc. v. Link-Belt Co.*, 371 F.2d 225, 229 (7th Cir. 1966)). “[Laitram’s] argument that *Deepsouth* sells the machines—based primarily on *Deepsouth*’s sales rhetoric and related indicia such as price—cannot carry the day unless it can be shown that *Deepsouth* is selling the ‘patented invention.’ The sales question thus resolves itself into the question of manufacture: did *Deepsouth* ‘make’ (and then sell) something cognizable under the patent law as the patented invention, or did it ‘make’ (and then sell) something that fell short of infringement?” *Id.* at 527. The district court predicated its decision on “making” under the “operable assembly” rule but held that the injunction “prohibit[ed] the sale proposed” without determining whether *Deepsouth* had sold the components or the entire invention. *Laitram Corp. v. Deepsouth Packing Co.*, 310 F. Supp. 926, 929 (E.D. La 1970) (emphasis added), *rev’d*, 443 F.2d 928 (5th Cir. 1971), *rev’d*, 406 U.S. 518 (1972), *superseded by statute*, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383. Yet, *Deepsouth*’s request for modification was related to the “manufacture and sale of a slitter and deveiner unit in unassembled form.” *Id.* at 926 (emphasis added). The Fifth Circuit’s framing of the question as “whether *Deepsouth* may sell its infringing machine in foreign markets. . .” presupposed that the sale was a foreign one. *Laitram Corp. v. Deepsouth Packing Co.*, 443 F.2d 936, 937 (5th Cir. 1971) (emphasis added), *rev’d*, 406 U.S. 518 (1972), *superseded by statute*, Patent Law Amendments Act of 1984, Pub. L. No. 98-622, 98 Stat. 3383.

174. See 35 U.S.C. § 271(a) (1952); *Carnegie Mellon Univ. v. Marvell Tech. Group, Ltd.*, 807 F.3d 1283, 1306 (Fed. Cir. 2015).

175. See *Transocean Offshore Deepwater Drilling, Inc. v. Maersk Contractors USA, Inc.*, 617 F.3d 1296, 1311 (Fed. Cir. 2010). “Finally, we reject [the] claim that the entire apparatus must have been constructed and ready for use in order to have been sold. Our precedent establishes that a contract can constitute a sale to trigger infringement liability. A ‘sale’ is not limited to the transfer of tangible property; a sale may also be the agreement by which such a transfer takes place. In this case, there was a contract to sell a rig that included schematics. . . . [Plaintiff] argues that these schematics show sale of the patented invention. This is a genuine issue of material fact sufficient to withstand summary judgment.” *Id.* (citing *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1319 (Fed. Cir. 2005)).

176. Compare 35 U.S.C. § 271(a) (1952), with 35 U.S.C. § 271(a) (2012).

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The Patent Act does not define “sell” or “sale.”¹⁷⁷ Indeed, what constitutes a sale for infringement purposes is not well settled.¹⁷⁸ It is unclear whether the *Deepsouth* Court would have considered Deepsouth’s arrangement a “sale” or an “offer for sale” had the claim been in kit form. However, there are compelling arguments to be made that it was a “sale” or an “offer for sale,” considering that Deepsouth characterized its sale as one of a complete machine and delivered its good FOB in New Orleans.¹⁷⁹ Yet, in addition to *what* was sold, *whether* a sale occurs also raises questions regarding both time and place.¹⁸⁰ Although it seems possible that liability could attach under Deepsouth’s facts given these developments in case law, it remains to be seen whether there would have been “sales” or “offers to sell” of either the complete machine or to a kit.¹⁸¹

V. CONCLUSION

Previous courts interpreted § 271(f) as being categorically inapplicable to large classes of activities,¹⁸² but the facts of *Life Tech* did not present that as an easy option. Even so, when tasked with determining what is “a substantial portion of the components of the invention,” the Court still precluded liability categorically—by determining that § 271(f)(1) required a quantitative assessment and holding that a substantial portion of the components of an invention is more than one.¹⁸³ This test does little to decrease the amount of ambiguity and uncertainty regarding the potential extent of liability that § 271(f) has created, but was likely

177. *NTP, Inc.*, 418 F.3d at 1319 (citing *Enercon GmbH v. ITC*, 151 F.3d 1376, 1381 (Fed. Cir. 1998)).

178. See CHISUM, *supra* note 118, § 16.02. “A series of Federal Circuit Decisions failed to settle on a precise definition of ‘sale’ or the place of a sale.” *Id.* (citing *Carnegie Mellon Univ. v. Marvell Tech. Group, Ltd.*, 807 F.3d 1283 (Fed. Cir. 2015); *Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 769 F.3d 1371 (Fed. Cir. 2014); *Transocean Offshore Deepwater Drilling Inc., v. Maersk Contractors USA, Inc.*, 617 F.3d 1296 (Fed. Cir. 2010)).

179. Brief for the Petitioner, *supra* note 32, at 36–37.

180. See CHISUM, *supra* note 118, § 16.02 (discussing case law developments regarding infringing “sales”).

181. If the law develops based on sales that implicate foreign jurisdictions, however, it is more likely that the presumption against extraterritoriality will result in “sales” being construed narrowly based on location. Indeed, the Federal Circuit declined to predicate liability for U.S. sales when goods were shipped to the U.S. FOB from Hong Kong or China. See *SEB S.A. v. Montgomery Ward & Co.*, 594 F.3d 1360, 1375 (Fed. Cir. 2010) (quoting *Litecubes, LLC v. Light Prods.*, 523 F.3d 1353, 1369 (Fed. Cir. 2008)) (holding that the “sale” location for the purposes of § 271 “must be the location from which the goods were shipped,” but noting that the FOB terms were not dispositive).

182. See discussion *supra* Section II.D.

183. See *Life Techs. Corp. v. Promega Corp.*, 137 S. Ct. 734, 737 (2017).

the lesser of two evils.¹⁸⁴

The Patent Reform Act of 1984 was passed to stimulate the reindustrialization of America and to decrease unemployment caused by foreign competition.¹⁸⁵ Attaching liability for exporting components of a patented invention overseas was part of that effort.¹⁸⁶ Yet, changes in manufacturing and trade practices have altered the intellectual property landscape, and now § 271(f) seems to undermine those goals.¹⁸⁷ Even *Promega*, while asking the Court to interpret the statute broadly, admitted that § 271(f)(1) already creates an incentive to move manufacturing overseas.¹⁸⁸ Nevertheless, it urged the Court not to decide the issue based on this incentivization, reasoning that is a job properly left to Congress.¹⁸⁹ During America's industrial heyday, perhaps taking on statutory ballast provided some stability. However, changes in manufacturing and supply have created imbalance between those interests. The Supreme Court's *Life Tech* decision avoided capsizing, but it is time to consider discharging the ballast and repealing § 271(f).

184. See discussion *supra* Section IV.A.

185. See 130 CONG. REC. H10525 (daily ed. Oct. 1, 1984).

186. See H.R. 6286, 98th Cong. (1984); H.R. 4526, 98th Cong. (1983); S. 1535, 98th Cong. (1983).

187. See discussion *supra* Section IV.A.

188. Brief for Respondent, *supra* note 94, at 38.

189. See *id.*