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In Paper Converting Machine Co. v. Magna-Graphics Corp., the Federal Circuit rejected the traditional operable assembly standard for determining a "making." In its place, the court adopted a more flexible standard that included partial assemblies that have no significant non-infringing purpose. This test for infringement significantly broadens patent protection and further restricts the permissible activity of competitors allowed during the patent term. The court's standard grants the patent owner a de facto monopoly beyond the expiration date by restricting competitors from making preparations to enter the market after the patent expires. The decision represents a movement by the Federal Circuit toward a much more protectionist view of patents. In achieving this result, however, the court disregarded strong precedent and left patent law uncertain.

This Note argues that Paper Converting improperly rejected the traditional operable assembly standard for determining a "making" in light of the prior case law, the established infringement doctrines, and the congressional balancing of competing interests under the patent grant. First, this Note demonstrates the applicability of Deepsouth Packing Co. v. Laitram Corp. and its operable assembly standard to the facts of Paper Converting. Second, it argues that Congress, in weighing the competing interests of the patent grant, incorporated the operable assembly standard into the balance as a limitation upon the patentee's exclusive rights. Third, this Note highlights the uncertainty caused by the Paper Converting standard for infringement and its negative impact on the doctrine of contributory infringement. Fourth, it demonstrates the limiting effect of Paper Converting on preparations of competitors made during the patent term for

1. 745 F.2d 11 (Fed. Cir. 1984).
4. See infra text accompanying notes 15-34.
6. For a discussion of the exclusive rights of a patent grant see infra notes 8-10 and accompanying text.
7. For a discussion of the doctrine of contributory infringement, see infra note 18.
post-patent market entry. Finally, this Note concludes that the Federal Circuit should have retained the traditional operable assembly standard instead of rewriting patent law.

I. BACKGROUND: THE “MAKING” STANDARD

A patent grants to its owner the right to exclude others from “making, using, or selling” the patented invention for a term of seventeen years. Under section 271 of the Patent Act, any unauthorized making, using, or selling of the patented invention within the United States during the patent term infringes the patent. Infringement occurs only when all the elements claimed in the patent, or their equivalents, are combined in the manner described by the patent. The omission of any one of the claimed elements avoids infringement. This definition of infringement requires a stringent standard under section 271 for determining at what point an infringer “makes” the patented invention. The traditional “making” standard

8. 35 U.S.C. § 154 (1982). “Every patent shall contain . . . a grant to the patentee, . . . for the term of seventeen years, . . . the right to exclude others from making, using, or selling the invention throughout the United States . . . .” Id. The patent grant represents an exchange between the public and the inventor. The inventor receives a bundle of exclusive rights for seventeen years. The public receives immediate disclosure of the invention and the later unlimited right to exploit it. One might expect the seventeen-year period to represent an informed legislative choice of the length of time needed to provide the proper incentive, but in fact, the choice is more a result of historical factors that simply have been perpetuated. See White, Why a Seventeen Year Patent?, 38 J. PAT. OFF. SOC’y 839, 840–42 (1956); 4 D. CHISUM, PATENTS § 16.04[1] (1983).


10. 35 U.S.C. § 271(a) (1982) states: “Except as otherwise provided in this title, whoever without authority makes, uses or sells any patented invention, within the United States during the term of the patent therefor, infringes the patent.” This simply incorporates the patent grant of § 154 in defining infringement. Section 271(a) is written in disjunctive form so that any one of the three activities, making, using, or selling, alone constitutes infringement.

11. In a patent application, the inventor must clearly state what is claimed as the invention. A patent sets forth these claims, and they are strictly scrutinized in an infringement action. See 4 D. CHISUM, PATENTS § 18.03[1] (1978).

12. The doctrine of equivalents defines as infringing all devices that perform “substantially the same function in substantially the same way to obtain the same result” as the patented invention. Graver Tank Co. v. Linde Air Prod. Co., 339 U.S. 605, 608 (1950). This prevents a competitor from making insignificant changes and thereby avoiding infringement. Id. at 607. See 4 D. CHISUM, PATENTS § 18.04 (1984).


In Prouty, the Court held that the defendant’s use of two of the three major components of a patented plow was not an infringement. The patent had been issued for the sum total of all the elements, and a use of all but one of the claimed elements avoided infringement. 41 U.S. at 340–41. This rule prevents the patentee from exercising exclusive control over any single element or grouping of elements short of the whole combination. Aro (I), 365 U.S. at 344–45.

14. The traditional standard required that the device be assembled to the point of operation before it infringed the patent. See Deepsouth, 406 U.S. at 528–29. Once this degree of assembly is achieved, the
required not only that all the claimed elements be present, but that the infringer assemble the device in a final operable form.

The issue of the proper "making" standard for section 271 came before the Supreme Court in *Deepsouth Packing Co. v. Laitram Corp.* In *Deepsouth*, the defendant manufactured all the parts of a patented shrimp deveining device but did not assemble it. Instead, the manufacturer shipped the parts to foreign buyers who assembled the devices outside the United States. Under section 271, the assembly abroad was not a direct infringement because the patent laws do not have extraterritorial effect. Absent a direct infringement, the defendant could not be a contributory infringer.

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16. Direct infringement is defined in § 271(a). *See supra* note 10. Section 271 also defines the corollary infringement doctrines of active inducement, § 271(b), contributory infringement, § 271(c), and exportation to actively induce infringement, § 271(f).

17. Section 271 makes it clear that making or using the patented device outside the United States is not an infringement. Infringement must occur within the United States and during the patent term. The patent system can grant no rights that extend beyond the territories of the United States. Brown v. Duchesne, 60 U.S. (19 How.) 183, 195 (1857). The recent addition of § 271(f) does not add extraterritorial effect to the patent laws but focuses instead solely on activity in this country. *See infra* notes 74–76 and accompanying text.

18. The doctrine of contributory infringement adds to the protection given the patentee and modifies the application of a strict operable assembly standard. Under the operable assembly standard, a manufacturer avoided infringement by leaving out one element and relying on the ultimate purchaser to supply the missing element to complete the device. The classic case is Wallace v. Holmes, 29 F. Cas. 74 (C.C.D. Conn. 1871) (No. 17,100). The patent there covered a kerosene lamp base with a chimney. The defendant, relying on the combination rule, manufactured and sold only the lamp base. The glass chimneys were readily available to the consumer purchaser who merely had to insert them into the defendant's lamp bases. By doing so, the consumer became the patent infringer, and the manufacturer avoided liability while still competing with the patentee.

Relying on joint tort liability, the court found the defendant liable as a joint infringer with the ultimate purchaser because of his efforts to bring the lamp into use and infringe the patent. The court held that strictly construing the direct infringement requirements would leave the patent useless. The patentee's only remedy would be against the purchasers—"a consequence which, considering the small value of each separate lamp, and the trouble and expense of prosecution, would make the complainants helpless and remediless." *Id.* at 80. This case was one of the first to adopt the doctrine of contributory infringement. *See generally* 4 D. CHISUM, PATENTS § 17.02 (1980).

The 1952 Patent Act codified the doctrine of contributory infringement in § 271(c). The statutory definition requires the component to be a material part of the invention and not a staple commodity suitable for a substantial noninfringing use. For a discussion of a "material part" and a "substantial noninfringing use", see 4 D. CHISUM, PATENTS § 17.03[3-4] (1980). In addition, the seller must have knowledge that the component is especially made or adapted for use in infringing the patent. *Id.*

Contributory infringement cannot stand alone—there must be a direct infringement. In *Aro(I)*, the Court stated, "It is plain that § 271(c)—a part of the Patent Code enacted in 1952—made no change in the fundamental precept that there can be no contributory infringement in the absence of a direct infringement." 365 U.S. at 341. An operable assembly violation of the patentee's exclusive rights by the ultimate maker or user is the only way a court can also find a contributor to be an infringer.
The question in *Deepsouth*, therefore, centered on whether the manufacture of all the component parts alone, without assembly, constituted a direct infringement under section 271(a). The court below had held that this was a "making" and that the word "makes" in section 271(a) should be given an ordinary meaning and not some artificial, technical construction. In so holding, the Fifth Circuit had adopted a substantial manufacture test for infringement.

In a five-to-four decision, the Supreme Court reversed the holding of infringement. The majority refuted the Fifth Circuit's substantial manufacture test, adopting the much narrower operable assembly definition of "makes." The Court held that a patent only protects the operable assembly of the invention and not the manufacture of its parts. The Court ruled that the operable assembly definition of "makes" was so firmly embedded in the patent law that it was unassailable absent a congressional recasting of the statute.


19. "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 . . . ." 406 U.S. at 527.


23. *Id.* at 527–29.

24. *Id.* at 528.

25. *Id.* In addition, the Court concluded that in light of the nation's "historical antipathy to monopoly and of repeated congressional efforts to preserve and foster competition," it should not expand the patent rights by overruling an established line of precedents without a clear and certain signal from Congress. *Id.* at 530–31.

Congress acted on this problem by adding two new subsections to § 271 in the fall of 1984. Subsection (f), approved after the *Paper Converting* decision, includes as infringement the exportation of unassembled goods in such a way as to induce a combination abroad that would infringe the patent if done within the United States. 35 U.S.C.A. § 271(f) (West 1985). This addresses the activity at issue in *Deepsouth*. See infra text accompanying notes 75–77.

26. 79 F.2d 626 (2d Cir. 1935).
the Second Circuit held that exporting assembled radio receivers without vacuum tubes inserted did not infringe the patent because the patent only protected the physical connection of the electrical circuitry in an operable relationship. Two years later, when the case was appealed for a second time to the Second Circuit, the court held that the patent had been infringed. New evidence revealed that the defendant had formed the protected electrical relationship by placing the tubes in the sockets in order to test the receivers before the sets left the factory. The court found infringement in this operable assembly of the receivers even though it was purely for testing purposes.  

27. Id. at 629. The defendants manufactured all the parts of the patented radio receivers except the vacuum tubes which were purchased on the open market. They assembled the receivers absent the tubes which were separately packaged and placed into the same carton as the receivers. To operate the radios, the purchaser needed only to place the tubes in their sockets and plug the radio into an electrical outlet. The claims at issue covered a method for producing alternating currents which depended on the relationship between the circuitry and the vacuum tubes. The court held that this relationship could not be attained until there was a "physical connection between the terminals of the circuits and the electrodes of the vacuum tube." Id. at 628. The patentee suffered no wrong until the combination was formed; the sale of elements capable of forming the patented invention, standing alone, did not violate the patentee's exclusive rights. Id.

28. Radio Corp. of America v. Andrea (Andrea II), 90 F.2d 612 (2d Cir. 1937). The entire combination was formed to test the receivers, so the invention was "made" and the patent infringed. The court held that once the patented combination is assembled, later disassembly will not erase the infringement. Id.

29. It is unclear whether the Andrea II court, however, considered the testing the only reason for the finding of infringement. The court first used the following language which seems to support a substantial manufacture test: "Where the elements of an invention are thus sold in substantially unified and combined form, infringement may not be avoided by a separation or division of parts which leaves to the purchaser a simple task of integration." Id. at 613. However, the court then cited with approval the Andrea I rationale that no infringement occurs until the parts are associated to form an operable assembly. Id. Due to this seemingly contradictory language, Judge Swan, the author of Andrea I, dissented in part in Andrea II because he was not sure of the effect of the majority view on the Andrea I opinion. See id. at 615 (Swan, J., dissenting in part).

Because of this ambiguity in the Andrea cases, the dissent in Deepsouth was suspicious of the weight given Andrea I by the majority. Justice Blackmun felt that Andrea I did not represent the "prevailing law" adopted by Congress in the Patent Act because it was undermined by the second case. Deepsouth, 406 U.S. at 533 (Blackmun, J., dissenting).

The two Andrea cases can be reconciled without affecting the operable assembly holding of Andrea I. The Second Circuit in Andrea II was determined to find infringement in the sale of the receivers in addition to the infringement by manufacture. The court wanted to indicate that once the receivers had been assembled, later disassembly did not prevent the sale from infringing. The court made it clear that a manufacturer cannot avoid infringement by disassembling the machine after the complete assembly has occurred. Hence the language from Andrea II, "Where the elements of an invention are thus sold in substantially unified and combined form, infringement may not be avoided by a separation or division of parts which leaves to the purchaser a simple task of integration," 90 F.2d at 613, relates only to the sale of these partially disassembled radio receivers. This interpretation is consistent with the facts of the case and the court's citation and reinforcement of Andrea I in the second case. Despite the seemingly ambiguous stance of the court in Andrea II, Deepsouth correctly represents the holding of the two cases as requiring an operable assembly before a finding of infringement.

Deepsouth was clearer in its approach to the same sales question. Infringement by sale simply
Deepsouth concluded that Congress incorporated the Andrea I operable assembly standard into the meaning of "makes" in section 271. The Court found no indication in the legislative history of section 271 of an intent to change the law of direct infringement. Instead, it perceived an intention to simply codify existing law. The Court found support for this conclusion in opinions of the Third and Seventh Circuits that followed the Andrea I operable assembly approach in interpreting section 271. The Court concluded that any finding of infringement under section 271 must be based on a complete operable assembly of the patented invention. Anything less than a complete assembly would not be an infringement. Cases since Deepsouth have continued to apply this strict operable assembly requirement.

II. THE PAPER CONVERTING DECISION

The Federal Circuit in Paper Converting Machine Co. v. Magna-Graphics Corp., interpreted Deepsouth so narrowly that it stripped Deepsouth of all precedential value. The court deviated significantly from the operable assembly standard and adopted a "making" standard closer to a substantial manufacture test for infringement.

depended on whether the device was ever "made." See supra note 19. If the manufacture does not infringe, then the sale will not infringe. If the patented invention is "made" and the patent is infringed, then the sale also will infringe. Deepsouth, 406 U.S. at 527.

30. Id. at 530.

31. The Court read the legislative history on § 271 as dealing almost exclusively with contributory infringement, active inducement and the problem of patent misuse. The Court found nothing stated concerning the standard for "making," but held that the overall intent of § 271 was to codify the existing case law. Id. at 530 n.10. See also S. Rep. No. 1979, 82d Cong., 2d Sess. 8, 28, reprinted in 1952 U.S. CODE Cong. & Ad. News 2394–95, 2402.

32. Deepsouth, 406 U.S. at 529 (citing Hewitt-Robins, Inc. v. Link-Belt Co., 371 F.2d 225, 229 (7th Cir. 1966)); Cold Metal Process Co. v. United Eng'g & Foundry Co., 235 F.2d 224, 230 (3d Cir. 1956)).

33. Deepsouth, 406 U.S. at 528.


In Deyerle v. Wright Mfg. Co., the Sixth Circuit reversed a finding of direct infringement of a patent on an apparatus used in hip surgery for fixation of fractures. The defendant made and stocked the parts separately and sold them on randomly received orders but never assembled the patented combination.

745 F.2d 11 (Fed. Cir. 1984).
Patent Infringement

Paper Converting Machine Company brought an infringement action in 1979 against Magna-Graphics Corporation for making and selling its patented "sequential automatic rewinder."\(^{36}\) An automatic rewinder is widely used in the paper products industry to wind rolls of paper toweling and toilet tissue.\(^{37}\) Magna-Graphics, in assembling its first automatic rewinder, attempted to make design changes to avoid infringing the patent. When Paper Converting brought suit, the district court found the changes to be insignificant and held that the patent had been infringed.\(^{38}\)

Magna-Graphics was at that time in the process of assembling a second rewinder for which it had a contract of sale. Attempting to avoid a second infringement, Magna-Graphics, on advice of counsel,\(^{39}\) negotiated with the buyer to delay delivery and final assembly of the machine until after the patent expired.\(^{40}\) After finishing production of the parts, Magna-Graphics partially assembled the rewinder and tested the moving parts.\(^{41}\) The tests

\(^{36}\) Paper Converting Machine Co. v. Magna-Graphics Corp., 211 U.S.P.Q. 788 (E.D. Wis. 1981), aff'd, 680 F.2d 483 (7th Cir. 1982). The original patent, No. 3,179,348, covered the sequential rewinder approach. In 1975, the patent claims were narrowed by reissue. No. Re. 28,353 ("353 patent"). The reissue patent received the same expiration date as the original—April 20,1982.

The '353 patent essentially claimed the pushers, pads, pins, and cutting means needed to cut, impale and glue a continuously unwinding roll of paper. The patent claimed in part the following:

1. In web-winding apparatus equipped with a frame, . . .
   (C) means for transversely severing said web to provide a free leading edge on said web for approaching a mandrel on which said web is to be wound in said path, [and]
   (D) pin means extensibly mounted on said roll for maintaining a web portion spaced from said edge in contact with said roll, and pusher means extensibly mounted on said roll to urge said maintained web portion against an adjacent mandrel . . .

4. In web-winding apparatus having a frame, . . .
   (D) a pusher mounted in said roll for extension out of said slot to overcome said maintaining means, said pusher being mounted rearwardly of said knife in the direction of roll rotation, and means for sequentially extending said knife and pusher, said extending means being operative to extend said pusher at a time when said slot is aligned with said path segment.

680 F.2d 483, 485 n. (7th Cir. 1982).

\(^{37}\) 745 F.2d at 13.

\(^{38}\) Paper Converting, 211 U.S.P.Q. at 788. The court held that Magna-Graphics had merely reversed the position of the severing means, the knife and the pins. Id. The Seventh Circuit affirmed the finding of liability. 680 F.2d 483 (7th Cir. 1982).

\(^{39}\) Paper Converting, 745 F.2d at 15. The advice of counsel not to assemble until after the patent expired was clearly in line with precedent. See, e.g., Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518 (1972).

\(^{40}\) This renegotiation received no attention from the Paper Converting majority; yet it has real bearing on the reasons given by the court for finding infringement. The court worried that the patent owner lost a sale during the patent term, although the sale did not occur until after the patent expired. See infra text accompanying notes 116–17.

\(^{41}\) Paper Converting, 745 F.2d at 15. Magna-Graphics only assembled parts of each mechanism and checked the positioning of each piece. For example, Magna-Graphics installed only two pusher pads on the bedroll instead of the thirty pads normally used in full operation. It checked the positioning of the pads to see whether they would contact the mandrel (the roll of new paperboard cores). During this part of the testing no cutoff blades or pins were installed. Id.
involved operating only single mechanisms at a time. Magna-Graphics never completely assembled and operated the machine as a whole. After the testing, Magna-Graphics shipped the machine to the buyer in two parts. Final assembly at the buyer's plant began six days after the patent expired and required six months to complete.

The Federal Circuit articulated the issue in this case as the "extent to which a competitor of a patentee can manufacture and test during the life of a patent a machine intended solely for post-patent use." The court held the patent rights infringed due to the amount of testing done on the product coupled with the sale and delivery of a "completed" machine. The machine was considered to be "completed" because it was ready for assembly and had no significant noninfringing use. The court held that a product need not be the complete and entire invention to infringe; an assembly sufficient for testing was enough. If the manufacturer was able to check the functionality of the device, then according to the court, the device must have been "made" within the meaning of section 271.

The Federal Circuit narrowly construed Deepsouth "as applicable only to the issue of the extraterritorial effect of the American patent law." The court distinguished Deepsouth as a case in which the infringing assembly occurred outside the patent jurisdiction, as opposed to Paper Converting, in which the assembly occurred in the United States after the patent expired. In refusing to apply Deepsouth to the facts in Paper Converting, the court reasoned that a five-to-four decision of the Supreme Court demanded caution in extension by analogy. The court also distinguished Deepsouth by concluding that the danger of giving extraterritorial effect to United States patents is more troublesome than the "horror" of allowing the

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42. Magna-Graphics ran its tests in two stages. First, it tested the operation of the parent roll and the positioning of the pusher pads that transferred the unwinding paper to the new shaft of cores. Second, it checked the cutoff mechanism and the blade attachment. The second stage of testing consisted of checking the action of the cutting blade to determine whether it properly cut the paper. For the test, Magna-Graphics installed a four-inch blade rather than the normally used 72-inch blade. It checked the latch mechanism to make certain it would eject the blade to cut the paper. During this testing no pins or pusher pads were installed. Id.

43. Id.

44. Id. at 24, 26 n.2 (Nies, J., dissenting). It is clear that more was required for final assembly than the proverbial tightening of the final screw. The rewinder was substantially reworked to conform to the buyer's operating system. Id.

45. Id. at 16.

46. Id. at 19-20.

47. Id.

48. Id. at 18.

49. Id. at 19-20.

50. Id. at 17.

51. Id.

52. Id.
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benefits of a patent to continue beyond expiration. Moreover, the court undermined *Deepsouth* by stating that *Deepsouth* misinterpreted the *Andrea* cases, concluding that the “making” standard that emerged from *Andrea II* required something less than a full and complete assembly.

The *Paper Converting* court feared a different result would “emasculate the congressional intent” of giving a patent full effect for the term of seventeen years. It saw the last year of a patent becoming worthless for a long lead-time article if the law allowed a competitor to partially assemble and test that device anytime during the patent term. Competitors would enter the market during the last year of the patent and contract for sales to be finalized after the patent expired. The court feared that allowing such activity would cause the patent owner to lose a sale for the invention that it would have made during the patent term but for the infringing acts.

A vigorous dissent characterized the majority opinion as “no less than a reversal of *Deepsouth.*” It noted that *Deepsouth* had expressly rejected the substantial manufacture test and concluded that the majority was reverting to that test. The dissent argued that the bright line drawn by the “operable assembly” test in *Deepsouth* provided certainty in the area of patent law while the majority’s opinion left the issue in the dark.

III. ANALYSIS

*Paper Converting* broadened the definition of infringement and increased the economic clout of a patent. The case illustrates the court’s willingness to discard old notions of patent law, such as the *Deepsouth* operable assembly standard, and reshape the scope of the patent grant. The court’s new standard for determining a “making” seems to approach a substantial manufacture test. This causes uncertainty for competitors and for the courts, who need a bright line by which to judge conduct and infringement. This new standard also diminishes the need for the doctrine of contributory infringement. It results in a grant of a de facto monopoly beyond the statutory term by delaying the entry of competition in the market for the patented invention.

53. *Id.*
54. *Id.* at 18.
55. *Id.* at 19.
56. *Id.*
57. *Id.*
58. See infra text accompanying notes 107–17.
59. 745 F.2d at 24, 26 (Nies, J., dissenting).
60. *Id.* at 24.
61. *Id.* at 26.
62. For a discussion of the doctrine of contributory infringement, see supra note 18.
63. See infra text accompanying notes 118–19.
The court rebalanced the competing interests of the patent grant, giving more weight to the interests of the patentee. In doing so, the court intruded upon the exclusive powers of Congress to extend the patent protection. The Federal Circuit overstepped its role by effectively rewriting the infringement section of the Patent Act. The goals of patent protection would be better served by maintaining the application of a strict operable assembly standard as established by precedent. Without some indication from Congress that it did not accept the Deepsouth standard, the Federal Circuit should not have enlarged the scope of patent protection.

A. Applicability of Deepsouth

The core of Deepsouth—the operable assembly standard—should have guided the court's decision in Paper Converting. The majority's efforts to distinguish Deepsouth fall short. Neither the exportation context of Deepsouth nor the narrow decision detract from Deepsouth's clear requirement of full operable assembly. Nor do the recent additions to section 271, which apply to the exportation aspect of Deepsouth, change the basic operable assembly requirement for infringement.

Under the infringement statute in force at the time, the Deepsouth defendant could only be liable if producing the separate parts of the machines in this country was enough to be a "making." Defining a "making" was the core of the decision. The Paper Converting court mistakenly interpreted Deepsouth's operable assembly requirement to apply only to the exportation of partial assemblies. The "extraterritorial effect" of the patent laws was never at issue. Exportation of the goods entered the case as an issue only because it precluded a finding of contributory infringement. Deepsouth explicitly stated the law as requiring a full

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64. By redefining direct infringement so that it sweeps in partial assemblies, the court intruded upon the application of the doctrine of contributory infringement. See infra text accompanying notes 100–03.

65. One way the court in Paper Converting tried to distinguish Deepsouth is by the narrow five-to-four decision in Deepsouth. See supra text accompanying note 51.

66. See 35 U.S.C.A. § 271(f) (West 1985). This section was added to the statute in September 1984. See infra text accompanying notes 74–77.

67. "Although in Deepsouth the Court at times used broad language in reaching its decision, it is clear 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.

68. The manufacture and sale of less than fully assembled devices is dealt with under the doctrine
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operable assembly of the alleged infringing device before any infringement can be found.

*Paper Converting* presented the same question as did *Deepsouth*: were Magna-Graphics' activities during the patent term enough to constitute a "making"? The machine was never fully assembled in an operable condition while the patent was in force.69 In order to find infringement, the court held that testing a subassembly sufficed to violate the patentee's rights.70 The court in *Paper Converting* interpreted the *Deepsouth* operable assembly standard to be flexible.71 But the operable assembly standard as laid out in *Deepsouth* is inflexible; it permits nothing less than a completely functioning whole to infringe a patent.72 In holding otherwise, *Paper Converting* destroyed the operable assembly standard73 and created its own standard. The new standard closely resembles a substantial manufacture standard, a standard explicitly rejected in *Deepsouth*.

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69. This is the key factual determination. The *Paper Converting* opinion clearly indicated that the claimed mechanisms were tested independently and only to a limited extent. 745 F.2d at 15. In no way was this an operable assembly under the *Deepsouth* standard of a complete assembly. Testing the individual parts on a limited scale is not testing of the whole invention. *Andrea II* provided the standard: the device must be complete at the time of testing to be an infringement. Radio Corp. of America v. Andrea, 90 F.2d 612 (2d Cir. 1937). See supra note 29.

70. Where, as here, 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.

*Paper Converting*, 745 F.2d at 19–20.

71. Id. at 18.

It does seem as if the concept of an "operable assembly" . . . is probably something short of a full and complete assembly; thus, if the infringer makes an "operable assembly" of the components of the patented invention, sufficient for testing, it need not be the same thing as the complete and entire invention.

72. *Deepsouth* clearly rejected a substantial manufacture test and any movement in that direction. "We cannot endorse the view that the substantial manufacture of the constituent parts of a machine constitutes infringement when we have so often held that a combination patent protects only against the operable assembly of the whole and not the manufacture of its parts." *Deepsouth* Packing Co. v. Laitram Corp., 406 U.S. 518, 528 (1972). *Deepsouth* also clearly adopted the strict *Andrea I* view of "made" as a final operable assembly where all the elements are associated together to form the patented combination. Id. at 528–29.

73. After discounting *Deepsouth*'s reliance on *Andrea I*, the *Paper Converting* court concluded that an operable assembly is probably something short of a full and complete assembly. 745 F.2d at 18. However, the operable assembly standard by its nature only has force as long as it is strictly applied. It is not flexible but unyielding. Adoption of any lesser standard is merely adoption of a form of substantial manufacture as a standard for infringement.
Since the *Paper Converting* decision, Congress indicated its concern for the result in *Deepsouth* by adding a new subsection to section 271\(^{74}\) that addresses the exportation of partial assemblies.\(^{75}\) Section 271(f) states that the act of exporting a substantial portion of the components of a patented invention that actively induces an infringing combination of the components is itself an infringement of the patent.\(^{76}\) Under this provision, the exportation of the shrimp deveining devices in *Deepsouth* would have infringed the patent because the conduct actively induced formation of the infringing combination abroad.\(^{77}\) Section 271(f), however, does not affect the operable assembly standard for “making.” It still requires an assembly abroad that would infringe the patent if done in the United States. This implies that the traditional operable assembly of the patented invention must occur abroad before the exportation of the unassembled components is an infringement.\(^{78}\) Congress apparently felt no need to redefine the operable assembly standard in section 271.\(^{79}\)

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75. The legislative history explains the purpose of § 271(f):

The . . . change . . . will prevent copiers from avoiding United States patents by supplying components of a patented product in this country so that the assembly of the components may be completed abroad. This proposal responds to the United States Supreme Court decision in *Deepsouth Packing Co. v. Laitram Corp.*, 406 U.S. 518 (1972), concerning the need for a legislative solution to close a loophole in patent law. . . . Subsection 271(f) makes it an infringement to supply components of a patented invention, or to cause components to be supplied, that are to be combined outside the United States.

76. Section 271(f)(1) reads:

> 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.


77. The active inducement concept is taken from the existing law of § 271(b). This concept also requires a direct infringement. The statute now reaches the exportation of components that actively induce an infringing combination. Exportation of a substantial portion of the components is enough to infringe. See 4 D. CHISUM, PATENTS § 16.02[7], at 16–23 (1985).

78. Section 271(f)(1) requires that the parts be assembled outside the United States “in a manner that would infringe if such combination occurred within the United States.” 35 U.S.C. A. § 271(f)(1) (West 1985).

79. Congress could have easily responded to *Deepsouth* by explicitly changing the operable assembly standard. Instead, it resolved the problem in such a manner that left the standard untouched. There is no indication that Congress knew of the *Paper Converting* decision that was decided only a few weeks before the statute was finally passed. If it took Congress twelve years to react to *Deepsouth*, it is unlikely Congress incorporated the *Paper Converting* decision into the changes in § 271, especially since certiorari was still possible to the Supreme Court.
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B. Upsetting the Congressional Balance

In establishing the patent system, Congress struck a balance between the competing interests of the inventor and the general public.\textsuperscript{80} Congress balanced the patentee's interest in the length and the extent of the patent protection against the public interest in full exploitation of new inventions.\textsuperscript{81} In the judgment of Congress, the grant of exclusive rights for a term of seventeen years provides the necessary incentive for inventors to disclose their inventions.\textsuperscript{82} To be fair to the consuming public, however, the scope of patent protection must be kept within prescribed limits. The operable assembly standard extends patent protection only to the whole assembly and prevents control over any grouping of elements short of the whole combination.\textsuperscript{83} Congress intended to place limits on patent protection by including the operable assembly standard within the meaning of "making" in section 271(a).

Congress knew of the \textit{Andrea} decisions\textsuperscript{84} when it enacted the Patent Act of 1952.\textsuperscript{85} It did not disapprove of the strict application of the operable assembly standard in those cases.\textsuperscript{86} Since 1952, Congress has repeatedly amended the Patent Act.\textsuperscript{87} Most recently, Congress added a new definition to the infringement section in the fall of 1984.\textsuperscript{88} Congress certainly knew of the application of the operable assembly standard yet did not change the law. The courts should leave to Congress the task of determining whether the operable assembly standard is too harsh. If it is, then as the Court noted

\textsuperscript{80} The Constitution gives authority to Congress to "promote the Progress of Science and the useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." U.S. CONST. art. 1, § 8, cl. 8. The patent grant represents an exchange of a bundle of exclusive rights for seventeen years from the state for the inventor's immediate disclosure and the later unlimited public exploitation of the invention. This monopolistic grant promotes the "Progress of Science and useful Arts" by providing the necessary economic incentive to find and bring new inventions out of the closet and onto the market. \textit{See} W. BOWMAN, PATENT AND ANTITRUST LAW 2-3 (1973).


The aim of the patent laws is not only that members of the public shall be free to manufacture the product or employ the process disclosed by the expired patent, but also that the consuming public at large shall receive the benefits of the unrestricted exploitation, by others, of its disclosures. . . . By the force of the patent laws . . . is the invention of a patent dedicated to the public upon its expiration . . . .


\textsuperscript{82} \textit{See supra} note 80.

\textsuperscript{83} \textit{See supra} notes 11–14 and accompanying text.

\textsuperscript{84} \textit{See supra} text accompanying notes 26–29.

\textsuperscript{85} \textit{See supra} text accompanying notes 30–34.

\textsuperscript{86} \textit{See supra} note 31.

\textsuperscript{87} Significant amendments were passed in 1961, 1972, 1975, 1980, 1982, and 1984.

\textsuperscript{88} \textit{See supra} notes 75–77 and accompanying text.
in *Deepsouth*, Congress alone has the authority to broaden the patent privilege and narrow the area of public use.\(^8\)

*Paper Converting* intrudes upon the prerogative of Congress by redefining the patent balance in favor of the patentee. By requiring less than full operable assembly, the court takes from the public the right to assemble parts of the patented invention and includes it within the patentee's exclusive rights. This result goes beyond the congressional indications of the intended scope of the patent.

C. Paper Converting's Standard

In holding the "making" standard to be something less than a full and complete assembly, *Paper Converting* turns one of the few bright lines of patent law into a dark maze of uncertainty. Whatever the objections to the *Deepsouth* standard,\(^9\) the operable assembly standard represented a clear test by which to judge infringement. With this test there was no guessing as to when the "heart" of the invention or the most significant parts of the invention had been "captured" by the alleged infringer. Competitors and the courts can with more certainty delineate the limits of patent protection under the operable assembly standard.

*Paper Converting*’s standard, on the other hand, is unclear. It is not certain whether the testing of subassemblies was the critical factor, or whether the court really was objecting to the manufacture of the components.\(^9\) The court felt the machines met the operable assembly requirement because they were "completed," defining "completed" as ready for assembly with no useful noninfringing purpose.\(^9\) The court also emphasized the fact that Magna-Graphics made a sale of the patented machine that would have gone to the patent owner if the infringement had not occurred.\(^9\) In a sense, the court seems to have added up "wrongs" to find infringement. It

\(^8\)Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518, 531 (1972).

\(^9\)The main objections can be found in the *Deepsouth* dissent, *id.* at 532 (Blackmun, J., dissenting), and in the Fifth Circuit's opinion in the case, *Deepsouth Packing Co. v. Laitram Corp.*, 443 F.2d 936 (5th Cir. 1971), rev'd, 406 U.S. 518 (1972). Primarily, the objections are that it takes away a portion of the patentee's protection and in so doing thwarts the constitutional intent of promoting the disclosure of inventions. These are the standard objections to any limitation placed on patent coverage by the courts. Congress, however, has considered these objections in balancing the competing interests of the patent grant. The congressional balance includes the operable assembly standard. *See supra* notes 80–89 and accompanying text.

\(^9\)The court coupled the testing of the rewinder with the sale and delivery of a "completed" machine and declared that together they constitute infringement. *Paper Converting Machine Co. v. Magna-Graphics Corp.*, 745 F.2d 11. 19 (Fed. Cir. 1984).

\(^9\) *Id.*

\(^9\) *Id.*
coupled the testing of the partial assemblies and the delivery of a "completed" machine with the loss of a sale to the patent owner to conclude that the exclusive rights of the patent suffered too much intrusion. It is impossible to discern what the court saw as the "major wrong" and whether such activity alone constituted infringement.

*Paper Converting* also injected additional subjectivity into the determination of infringement. *Paper Converting*'s concept of a "completed" machine implies that patent protection is given to some combination of parts of the patented invention. This forces a court to use its subjective judgment as to which parts of the patent deserve protection. Applying such subjectivity to an already unclear standard makes it very difficult for competitors, the public or the courts to determine what is protected by a patent and what activities infringe. Patent law requires greater certainty than this approach allows.

The Federal Circuit is in a unique position to chart the course of patent law. Indeed, with only limited Supreme Court review, it has a license to develop the law in this area. Congress created the Federal Circuit to bring greater uniformity and consistency to the law of intellectual property. Instead, decisions like *Paper Converting* indicate a willingness of the court to discard established precedents and chart a new unsteady course. The decision reveals that no patent standard or doctrine is impregnable, leaving patent law on an unsure footing. The court's concept of infringement is obviously in transition and *Paper Converting* indicates the court will cut deeper into the activities of competitors and further expand patent protection.

**D. The Detrimental Effect on Contributory Infringement**

Direct infringement is the backbone of the statutory infringement scheme. Redefining the scope of direct infringement causes a realignment of the related infringement doctrines. The broader definition of infringement in *Paper Converting* diminishes the need for the doctrine of contributory infringement.

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94. *See supra* note 21.
95. *See supra* note 2.
96. In creating the Federal Circuit, Congress recognized that the Supreme Court was operating at full capacity and could not be expected to take more patent cases. At the same time, controversies in patent law continue to grow in number and in complexity. *See supra* note 2.
Contributory infringement protects the patentee from a harsh application of the operable assembly standard by placing within the patentee's exclusive control all components of the invention that have no significant noninfringing use. The doctrine, however, places a limit on this protection by requiring a direct infringement by operable assembly before contributory liability can be imposed. In contrast, the substantial manufacture test requires only partial assembly in determining infringement and does not consider the eventual total construction. It would not matter if the machine were eventually noninfringing as long as at some point "substantial manufacture" of the invention occurred. This standard removes potentially noninfringing devices from public use. Under a substantial manufacture standard for "making," contributory infringement is subsumed under a broader definition of direct infringement, voiding the existing statutory scheme for determining infringement.

The court in Paper Converting was faced with activities that were permitted under the previous interpretation of the infringement statute. Magna-Graphs' actions would have been direct infringement had final assembly taken place while the patent was still in force. Its actions would have been contributory infringement had the buyer refused to wait and had assembled the machine while the patent was still in force. Since neither occurred, the court should have found no infringement to be consistent with the statutory scheme. Instead, the court bent the doctrine of direct infringement to remedy a perceived injustice—a lost sale of the patented invention during the patent term.

By lowering the threshold for direct infringement, the court in Paper Converting diminished the need for the doctrine of contributory infringement. Not only did this lower standard upset the congressional statutory scheme for infringement, but it also granted a greater degree of patent protection than provided by the doctrine of contributory infringement.

100. Section 271(c) codified the existing case law requiring that the device not be a staple article or one suitable for substantial noninfringing use. 35 U.S.C. § 271(c) (1982). See supra note 18.
101. See supra note 18.
102. The Paper Converting court was not concerned with whether the final assembly as modified infringed the patent. The final assembly could not infringe because the patent had expired. The changes made to accommodate the buyer could have taken the device out from under the patent claims. The court, however, was only concerned with whether, at the time of testing, there was sufficient resemblance to infringe.
103. Under a substantial manufacture test, for example, the kerosene lamp of Wallace v. Holmes, 29 F. Cas. 74 (C.C.D. Conn. 1871) (No. 17, 100), would have been enough of an assembly to be a direct infringement, eliminating the need for contributory infringement. See supra note 18.
104. Paper Converting Machine Co. v. Magna-Graphs Corp., 745 F.2d 11, 16 (Fed. Cir. 1984). "We notice, but Magna-Graphs adds that it is totally irrelevant, that Paper Converting has lost, during the term of its patent, a contract for the patented machine which it would have received but for the competitor's acts." Id.
E. Restrictions on Preparations for Post-Expiration Market Entry

The court in *Paper Converting* was very concerned that the patentee had lost a sale for the patented invention during the patent term. The court concluded that the patent owner lost control over the last year of the patent under a strict application of the operable assembly standard. On the surface, application of a strict operable assembly test may appear to allow a competitor to take some of the benefit of the patent away from the patentee. In practice, however, the operable assembly standard takes nothing from the patent grant. The patentee still exercises control over sales of devices to be completed during the patent term. The operable assembly standard does allow competitors to make preparations during the patent term that facilitate market entry soon after the patent expires. On the other hand, *Paper Converting*'s standard limits competitors' preparations and results in a grant of a de facto monopoly after the patent expires.

Upon expiration of the patent, an invention becomes available for full public use and exploitation. A competitor of the patent owner has the full right to place an exact duplicate of the product on the market immediately after the patent expires. Prior case law consistently applied the operable assembly standard and allowed all preparations for post-expiration market entry short of actual “making” or “using” during the patent term. For example, contracting to make or sell an infringing article was not itself an infringement even though it displaced a contract that otherwise would have. 

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105. *Paper Converting*, 745 F.2d at 19.
106. *Id.*
107. A strict application of operable assembly would allow competitors to partially assemble during the patent term in preparation for market entry after expiration of the patent. For economic reasons these preparations would most likely come in the last year of the patent term. Thus, *Paper Converting* argued that such strict application would erode the last year of the patent.


The defendant has on hand and is making more lens-holder blanks, which can be completed into those that would infringe or those that would not; and has advertised that he would furnish those of the patent at reduced prices after the expiration of the patent... Till completed, these things would not infringe, and when completed the patent will not be in force to be infringed. The [patentee] has a monopoly of making, using, and vending to others to be used, during the term only of the patent. Everyone else has the right to do anything as to that during that term which stops short of the patented article itself, and to come to that as soon as may be after the expiration of the term by any preparation which does not amount to that before. This leaves to him all that his patent covers, and to others what it does not cover.

*Id.*
gone to the patentee. Nor were advertising, displaying, and soliciting sales of the patented invention considered to be intrusions upon the patentee’s rights. Even partial delivery before the patent expired did not infringe. Under the traditional operable assembly standard, a competitor could collect the component parts and have them ready for assembly and sale of the completed article immediately after the patent expired.

This standard allows competitors to cut off the effects of a patent at expiration. The patentee, however, benefits from a similar standard at the beginning of the patent term. The grant of a patent cuts off all unauthorized making and using of the patented invention. Any buyer who purchased the device from someone other than the patentee before the patent issued is prevented from using it during the patent term. This prevents, in effect, any development of the patented device for months prior to the issuance of the patent. Therefore, any seeming injustice resulting from the application of the traditional operable assembly at the end of the patent is balanced by a benefit at the beginning.

The Paper Converting court felt that allowing preparations like those of Magna-Graphics robbed the patentee of the full right to the market for the patented machine. The facts of the case, however, reveal no loss of the ability to control the sales of the machine during the statutory period. Magna-Graphics bargained with the buyer to postpone the sale until after the patent expired. If the buyer wanted a machine in operation prior to that time, it could have purchased from the patentee. It agreed instead to buy a noninfringing machine to be delivered after the expiration of the

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111. In Van Kannell Revolving Door Co. v. Revolving Door & Fixture Co., 293 F. 261, 262 (S.D.N.Y. 1920), Judge Learned Hand wrote:

[T]he question [is] whether it was an infringement for the defendant to take away from the plaintiff a contract calling for a door covered by the patent, and later to change the structure so that it did not infringe. . . . [T]he patentee may prevent any one from making, selling, or using a structure embodying the invention, but the monopoly goes no further than that. . . . If, therefore, anyone says to a possible customer of a patentee, "I will make the article myself; don’t buy of the patentee," while he may be doing the patentee a wrong, . . . the promise itself is not part of the conduct which the patent forbids; it is not a subtraction from the monopoly . . . [P]erhaps it is a wrong, . . . but certainly it is not an infringement of the patent. Id. at 262. See also Marine Electric Corp. v. Vapor Corp., 204 U.S.P.Q. 362 (N.D. Ill. 1979) (a contract to manufacture that which would infringe is not infringement).


116. As described in Van Kannell Revolving Door Co. v. Revolving Door & Fixture Co., 293 F. 261, 262 (S.D.N.Y. 1920), it is not an infringement to induce the buyer to modify his requirements (in this case the time of delivery) to avoid infringement.
patent. Magna-Graphics had an absolute right to sell the rewinder after the patent expired. Paper Converting did not lose the last year of the patent. It still enjoyed the rights to make, use or sell the completed machine until the very end of the seventeen year period. 117

By preventing these preparations, Paper Converting created a de facto monopoly that extends beyond the statutory period. It protects the patentee for the additional length of time necessary for competitors to prepare for production and place a product on the market. This de facto monopoly eschews the balancing already done by Congress in the patent grant. 118 Congress decided to limit the patent control to seventeen years. The patent laws dedicate the invention to public use immediately upon expiration of the patent. 119 In attempting to protect the patentee’s rights for the full patent term, the court’s decision actually extended those rights beyond the expiration of the patent.

Paper Converting cited another recent Federal Circuit case, Roche Products, Inc. v. Bolar Pharmaceutical Co., 120 as compelling its result. In Roche, the court held that Bolar’s use of Roche’s patented drug in FDA-required testing, which was intended solely to facilitate Bolar’s post-patent market entry, infringed the patent. 121 Paper Converting cited Roche as support for the fact that “use” infringement includes testing a product in preparation for post-patent market entry. 122 The court then concluded that Magna-Graphics’ testing of the partial assemblies fell within this rule because the purpose of the use was the same as that in Roche. 123

The Paper Converting court, however, failed to recognize the key distinction between Magna-Graphics’ testing and the testing of the drug in Roche. In Roche, Bolar’s use of the complete patented invention in the testing was clear, and the question before the court was whether the purpose of the use exempted it from infringement. 124 Roche holds that using the fully assembled patented invention for the purpose of facilitating

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117. As long as no one is able to make use of the partially assembled device until after the patent expires, what loss has the patentee suffered? The only loss is a post-expiration sale—an event predetermined by the patent grant. See supra note 81.
118. The balancing grants the public the right to fully exploit the patent upon its expiration in exchange for the seventeen year monopoly. See supra notes 80–81.
120. 733 F.2d 858 (Fed. Cir. 1984).
121. Id.
123. Id.
124. Roche, 733 F.2d at 862–65. Bolar Pharmaceuticals, the defendant, sought to have the use excepted from infringement based on an experimental purpose or a public policy exemption, but the court held that these exceptions did not exempt the testing from infringing. Id.
post-patent market entry does not prevent a finding of infringement. In Paper Converting, however, the question is not whether testing of a complete invention for post-patent market entry should be exempted, but whether the patented invention was ever present in the first place. The similarity of the purpose of the testing—preparation for market entry after the patent expires—therefore does not control.

IV. CONCLUSION

A patent grants exclusive rights to the patent owner in exchange for disclosure of the invention and later unlimited public use of the device. The traditional operable assembly standard served to limit that grant by allowing the patentee to control only fully assembled and operable articles that include all the elements claimed in the invention. The Supreme Court specifically applied this standard in Deepsouth Packing Co. v. Laitram Corp. The traditional operable assembly standard is consistent with the other doctrines of patent law. It provides a bright line by which to determine infringement. It also allows competitors to prepare to enter the market for the patented invention immediately after the patent expires.

The Paper Converting standard, on the other hand, expands the powers of the patentee to exclude all items that represent the “heart” of the invention. It requires less than full final assembly and approaches the substantial manufacture test. Paper Converting’s standard is uncertain and leads to a more subjective test for judging infringing activity. Substantial manufacture requires a guess by the court that the object as assembled will infringe in final form. It also emasculates the doctrine of contributory infringement. This test was specifically rejected in Deepsouth.

Paper Converting gave the patentee overly broad powers to control the market both during the patent term and after the patent expires. This grant of a de facto monopoly and the ability of the patentee to control competitor preparations for post-patent market entry upsets the congressional balancing in the Patent Act. The invention is available for full public exploitation upon expiration of the patent. The patentee’s control over the invention ends with expiration of the patent just as the public use ended with the grant

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125. Id. The court held that the testing was not within the traditional limits of the experimental use doctrine since it was a commercially valuable use—even though the value would be realized after the patent expired. Id. at 862–63. The court declined to resolve the public policy question, leaving it instead to Congress. Id. at 863–65. Congress subsequently addressed the problem presented in Roche in title II of the Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, tit. II, 98 Stat. 1598–99 (codified as amended in scattered sections of 21 U.S.C.). The statute provides for extension of patents that have lost some of their effective term due to a delay in FDA approval. It also greatly reduces the testing required before a generic copy of a previously FDA-approved drug can be placed on the market.
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of the patent. The operable assembly standard for “making” gives effect to this balancing of the interests and should have been maintained by the court in *Paper Converting*.

Absent congressional action to change the law, the Federal Circuit should have stayed within the guidelines set by the *Deepsouth* opinion. *Paper Converting* left patent infringement on uncertain ground. Patent law would benefit by a quick return to the certainty of the strict operable assembly standard instead of being left to flounder in the wake of *Paper Converting*.

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