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Property Rights Theory and Patent-Antitrust: The Role of Compulsory Licensing

Martin J. Adelman
Wayne State University

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PROPERTY RIGHTS THEORY AND PATENT-ANTITRUST: THE ROLE OF COMPULSORY LICENSING

MARTIN J. ADELMAN*

To promote creative activity, the patent system, like its copyright and trade secret counterparts, sanctions otherwise impermissible monopoly powers over patented products and processes, powers that are often viewed with alarm by advocates of a freely competitive market structure. Those who question the propriety of limiting these monopoly powers through the antitrust laws have found support for their defense of unrestrained patent exploitation in theories of property rights that endorse incentives to internalize the costs and the benefits inhering in ownership. In this Article, Professor Adelman submits that acceptance of a property rights view of patents requires the regulation of certain pricing, licensing, and suppression techniques used by patentees to undermine the effectiveness of the patent validity system. He proposes that courts exercise their equity powers in infringement suits to devise a compulsory licensing rule with a twist, one designed to accommodate both the patent holder's legitimate interest in obtaining his rightful share of the monopoly profits and society's interest in limiting any appropriation to the social value of the invention.

INTRODUCTION

For well over a century after Congress passed the first patent statute,[1] American law vigorously fostered and protected property rights in inventions.[2] The appropriate scope of those rights, how-

* Professor of Law, Wayne State University Law School. A.B., 1958, M.S., 1959, J.D., 1962, University of Michigan.

[1] Act of Apr. 10, 1790, ch. 7, 1 Stat. 109 (current version at 35 U.S.C. §§ 1-376 (1970 & Supp. V 1975)).

[2] *See, e.g.*, Henry v. A.B. Dick Co., 224 U.S. 1, 26-36 (1912); Continental Paper Bag Co. v. Eastern Paper Bag Co., 210 U.S. 405, 423-26 (1908); Bement v. National Harrow Co., 186 U.S. 70, 91 (1902); Hogg v. Emerson, 47 U.S. (6 How.) 437, 486 (1848); Grant v. Raymond, 31 U.S. (6 Pet.) 178, 197 (1832); Heaton-Peninsular Button-Fastener Co. v. Eureka Specialty Co., 77 F. 288, 289-96 (6th Cir. 1896).

The solicitude of western legal systems for property rights in inventions has had important consequences. For example, Professors North and Thomas suggest that the development of patent law in England fueled the industrial revolution. *See* D. NORTH & R. THOMAS, THE RISE OF THE WESTERN WORLD 2-3, 152-56 (1973).

ever, has long been a matter of some dispute,[3] reflected today in efforts to restrict the monopoly power of patentees. Congress, for example, included a limited compulsory licensing provision in the Clean Air Amendments of 1970[4] and has seriously considered several broader compulsory licensing bills during the past few years.[5] In various speeches and articles over the past decade, Justice Department officials have urged an end to the presumed exemption of certain patent practices from scrutiny under the antitrust laws.[6] This continuing dispute reflects the failure of economists to agree on the economic impact of patent regulation, a failure that led Professor Machlup to comment in a 1958 congressional study:

> If we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it.[7]

The opposing views of Professors Bowman and Turner exemplify the central disagreement. Professor Bowman has published a spirited

[3] SUBCOMM. ON PATENTS, TRADEMARKS, AND COPYRIGHTS OF THE SENATE COMM. ON THE JUDICIARY, 85TH CONG., 2D SESS., AN ECONOMIC REVIEW OF THE PATENT SYSTEM, STUDY NO. 15, at 3-5, 25-44 (Comm. Print 1958) (prepared by F. Machlup) [hereinafter F. MACHLUP]; *see, e.g.*, A. BURNS, THE DECLINE OF COMPETITION 11 (1936); W. HAMILTON, PATENTS AND FREE ENTERPRISE, INVESTIGATION OF CONCENTRATION OF ECONOMIC POWER (TNEC Monograph No. 31, 1941); F. HAYEK, THE ROAD TO SERFDOM 28 (1944); F. VAUGHN, ECONOMICS OF OUR PATENT SYSTEM 106 (1925); L. VON MISES, HUMAN ACTION: A TREATISE ON ECONOMICS 658 (1949).

[4] Pub. L. No. 91-604, § 12(a), 84 Stat. 1676 (codified at 42 U.S.C. § 1857h-6 (1970)). For a discussion of the compulsory licensing provision of this legislation, see Schwartz, *Mandatory Patent Licensing of Air Pollution Control Technology*, 57 VA. L. REV. 719 (1971).

[5] *E.g.*, S. 814, 94th Cong., 1st Sess., 121 CONG. REC. 4059 (1975), *discussed in* note 86 *infra*; *see* Arnold & Goldstein, *Compulsory Licensing: The "Uncentive" for Invention*, 7 PAT. L. REV. 113, 121-23 (1975); Arnold & Janicke, *A Statutory Approach to Compulsory Licensing*, 5 PAT. L. REV. 203, 203-05 (1973).

[6] Donnem, *The Antitrust Attack Upon Restrictive Patent Licenses*, 49 MICH. ST. B.J. 36 (1970); Stern, *Antitrust Implications of* Lear v. Adkins, 15 ANTITRUST BULL. 663 (1970); Turner, *Patents, Antitrust and Innovation*, 28 U. PITT. L. REV. 151 (1966) [hereinafter Turner, *Patents*]; Address by Richard W. McLaren, *Recent Cases, Current Enforcement Views, and Possible New Antitrust Legislation*, 17th Ann. Spring Meeting of the Antitrust Section of the American Bar Association (Mar. 27, 1969), in 38 ANTITRUST L.J. 211 (1969); Address by Richard H. Stern, *A Future Look at Patent Fraud and Antitrust Laws*, Federal Bar Association Symposium (Sept. 25, 1969), in 52 J. PAT. OFF. SOC'Y 3 (1970); Address by Bruce B. Wilson, *Patent and Know-How License Agreements: Field of Use, Territorial, Price and Quantity Restrictions*, Fourth New England Antitrust Conference (Nov. 6, 1970), in ANTITRUST PRIMER: PATENTS, FRANCHISING, TREBLE DAMAGE SUITS 11 (1970).

[7] F. MACHLUP, *supra* note 3, at 80.

defense of unrestrained exploitation of patents,[8] suggesting that patent practices, however restrictive, should be lawful when they permit the patentee to capture the monopoly profit inherent in the superiority of the patented process or product over its competitors.[9] Moreover, he contends that many currently prohibited patent practices are merely methods of fully capturing the profits rightfully attaching to the patent monopoly,[10] and thus are not, the Supreme Court to the contrary,[11] monopoly extension practices.[12] In contrast, Professor Turner argues that restrictive patent practices cannot be justified merely because they allow a patentee to capture his full monopoly profit. He maintains that subjecting patent exploitation to antitrust limitations would not discourage, or even significantly reduce the rewards of, inventive activity.[13]

In effect, Professor Turner questions the proposition that "were it possible, society should feel a moral obligation to compel all who use an idea to pay monetary tribute to its creator."[14] Absent the

[8] W. BOWMAN, PATENT AND ANTITRUST LAW (1973).

[9] *See id.* at 54, 63, 64, 240.

[10] *Id.* at 53-119. Professor Bowman analyzes vertical agreements and concludes that they enable a monopolist to capture no more than the full value of the patent monopoly. *Id.* at 64-119. More generally, he implies that monopoly power can never be augmented by vertical arrangements. *Id.* at 53-63. It is this broader proposition rather than its application to patent arrangements that Professor Williamson gently criticizes in his review of Professor Bowman's book. Williamson, Book Review, 83 YALE L.J. 647, 654-59 (1974). The notion that vertical arrangements are not monopoly-extending seems to be derived from the oral tradition of antitrust analysis associated with the teachings of Professor Aaron Director of the University of Chicago Law School. *See, e.g.*, W. BOWMAN, *supra* note 8, at 58; Burstein, *A Theory of Full-Line Forcing*, 55 NW. U.L. REV. 62, 64 n.6 (1960).

[11] International Salt Co. v. United States, 332 U.S. 392, 396 (1947); Mercoid Corp. v. Minneapolis-Honeywell Co., 320 U.S. 680, 684 (1944); B.B. Chemical Co. v. Ellis, 314 U.S. 495, 498 (1942); Morton Salt Co. v. G.S. Suppiger Co., 314 U.S. 488, 490-91 (1942); International Business Machs. Corp. v. United States, 298 U.S. 131, 138-40 (1936); United Shoe Mach. Corp. v. United States, 258 U.S. 451, 462 (1922).

[12] W. BOWMAN, *supra* note 8, at 54-57.

[13] Turner, *The Patent System and Competitive Policy*, 44 N.Y.U.L. REV. 450, 459 (1969) [hereinafter Turner, *Patent System*]; *see* C. KAYSEN & D. TURNER, ANTITRUST POLICY 160-68 (1959); Turner, *Patents, supra* note 6, at 151-52. Professor Turner served as Assistant Attorney General in charge of the Antitrust Division from 1965 until 1968, and his views clearly dominate the Department's attitude toward patents. Adelman & Juenger, *Patent-Antitrust: Patent Dynamics and Field-of-Use Licensing*, 50 N.Y.U.L. REV. 273, 300-05 (1975).

[14] Turner, *Patent System, supra* note 13, at 457. Professor Turner supports his view by quoting extensively, *id.* at 457-58, from Rahl, *The Right to "Appropriate" Trade Values*, 23 OHIO ST. L.J. 56 (1962). Rahl concludes as follows: "It is not freedom of competition which requires apology. It is interference with freedom which must always be explained." *Id.* at 72. This approach elevates free-riding to a basic human right so that any limitation on the right to free-ride must be justified by special circumstances.

word "moral," this proposition parallels the views recently expressed by scholars working with theories of property rights.[15] These theories maintain that a system of property should be structured to ensure that the costs and benefits of an activity accrue to the person conducting that activity.[16] Applied to the patent area, the theories suggest that society should provide an inventor with an economic return from his invention commensurate with its social value by preventing the practice of free-riding on economically valuable creations. Unfortunately, property rights theories governing inventions are not as simple as those governing tangible property. Consequently, although a supporter of patent exploitation like Professor Bowman implicitly accepts the underpinnings of property rights theory, his analysis fails to account for certain unique features of patent rights as property. These features and the problems they engender indicate that application of a property rights theory to the patent area does not support a policy of unrestrained exploitation. Rather, such an application suggests that, in certain circumstances, restrictions on the patentee's monopoly power, like compulsory licensing, would be consistent with the character of patents as property.

This Article begins by examining the economic function of the patent system and the ways in which the "unique features" of that system permit private parties to undermine its function. Two rules are then suggested for regulating patentee behavior to prevent appropriation by the patentee of a monopoly profit in excess of the social value of the invention. Finally, the Article establishes, by reference to the patent misuse doctrine, that the implementation of the suggested rules is within the courts' competence.

I

For the past two centuries the western world has created wealth on an unprecedented scale through the development of new technology. This creation of wealth through competitive economic activity in

[15] *See, e.g.*, Demsetz, *Towards a Theory of Property Rights*, AM. ECON. ASS'N PAPERS & PROC. 347 (79th Ann. Meeting 1966), in 57 AM. ECON. REV. (1967); Furubotn & Pejovich, *Property Rights and Economic Theory: A Survey of Recent Literature*, 10 J. ECON. LIT. 1137, 1141-46 (1972); Randall, *Property Rights and Social Microeconomics*, 15 NAT. RESOURCES J. 729, 733 (1975).

[16] *See* Demsetz, *supra* note 15, at 348-49. Professor Demsetz, a leading property rights scholar, states the proposition as follows: "A primary function of property rights is that of guiding incentives to achieve a greater internalization of externalities." *Id.* at 348.

the invention of processes and products has been fostered by two distinct property rights systems—trade secrets[17] and patents—designed to protect inventors against free-riding and hence enable them to appropriate to themselves at least a part of the social value of their inventions.[18]

Trade secret law is a simple system for the prevention of free-riding on process inventions. Its operating premise is that although others may independently duplicate and use an invention, they are not entitled to free-ride.[19] Consider, for example, an invention that is the only known method for making a new but unpatentable product. If the process is protected by secrecy from appropriation by others, then its owner may capture most of its value so long as the process is not rediscovered through independent efforts. The possibility of independent rediscovery has important consequences for consumers in controlling the value that an inventor can appropriate to himself, because in many cases the owner of the secret invention cannot hope to capture its full social value before it is independently duplicated by others seeking to share in high profits. To inhibit independent reinvention, the inventor is likely to reduce his charge and profit and thereby share with consumers the wealth created by the new technology.[20] The trade secret system, then, effects a self-

[17] Although the most frequently cited trade secret case, E.I. du Pont de Nemours Powder Co. v. Masland, 244 U.S. 100 (1917), rejected the concept of property as a basis for trade secret protection, *id.* at 102, as did the Restatement, RESTATEMENT OF TORTS § 757, Comment a, at 4 (1939), the law of trade secrets creates a legally protected interest in secret information. Secret technology has all the legal incidents of property: given reasonable security precautions, it may not be lawfully used by others without the approval—through sale, license, or inheritance—of its creator.

[18] F. MACHLUP, *supra* note 3, at 56-62.

[19] *See* Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 476 (1974).

[20] A simple model to show the relationship between market entry and the rate of return to the holder of a trade secret can be readily developed. Assume that the derived demand curve for the secret technology is $r = a - bq$, where q is the yearly output and r is the unit monopoly profit or imputed unit royalty. Output under simple monopoly exploitation, q_o, would be $\frac{a}{2b}$, and the yearly monopoly profit, MP, equal to the unit royalty times the yearly output, would be $\left(\frac{a}{2}\right)\left(\frac{a}{2b}\right) = \frac{a^2}{4b}$. If we assume that the product has a twelve-year life, then the total monopoly profit would be $\frac{12a^2}{4b} = \frac{3a^2}{b}$. To determine under what circumstances others could be expected to enter the market, let us assume that the first owner follows the Sylos postulate, that is, will not alter his output in response to entry. *See* D. NEEDHAM, ECONOMIC ANALYSIS AND INDUSTRIAL STRUCTURE 99-103 (1969). An entrant who independently develops the technology, then, would face a Marshallian derived demand, r_e, of $a - b(q_e + q_o)$ or

regulating control of return by preventing the development of a substantial disparity between the cost of creating new technology and the value that can be privately appropriated. Yet the trade secret system has disadvantages as well. Secrecy is achieved at a cost. It renders the sale and licensing of technology cumbersome and inefficient.[21] In many cases, the security required to maintain secrecy is costly.[22] Moreover, the trade secret system is only available for process inventions; product inventions, of course, lose their secrecy protection upon introduction into the market.[23] Finally, reinvention, which from society's viewpoint is a waste of money, time, and talent, may occur quite frequently: licensing secrets is risky for the inventor and thus expensive, and as a practical matter those who would be willing to pay the license fee rather than incur the costs of reinvention may well be unaware of the secret's existence. These defects, coupled with the ever-present and socially beneficial possibility that disclosure of process inventions may act as a stimulus to further technological crea-

$\frac{a}{2} - bq_e$, *see id.* at 98, and the yearly monopoly profit of the entrant, MP_e, would be $r_e q_e = \frac{aq_e}{2} - bq_e^2$. Maximum profit would be achieved when

$$\frac{a}{2} - 2bq_e = 0, \text{ or when}$$

$$q_e = \frac{a}{4b}.$$

Thus maximum $MP_e = \left(\frac{a}{2} - bq_e\right)\left(\frac{a}{4b}\right) = \frac{a^2}{16b}$. Again assuming a twelve-year life, the total monopoly profit which an entrant could capture would be $\frac{12a^2}{16b} = \frac{3a^2}{4b}$. Entry could be expected if the cost of redeveloping the technology were less than $\frac{3a^2}{4b}$. If this were the case, then the original developer could eliminate the threat of entry by lowering the imputed royalty rate through output increases. Using this model it appears that with trade secret protection inventions may return a substantial monopoly profit.

[21] Professor Arrow has commented on this problem as follows:

> [T]here is a fundamental paradox in the determination of demand for information; its value for the purchaser is not known until he has acquired it without cost. Of course, if the seller can retain property rights in the use of the information, this would be no problem, but given incomplete appropriability, the potential buyer will base his decision to purchase information on less than optimal criteria.

Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS 609, 615 (National Bureau of Economic Research 1962).

[22] Fortunately, businesses are only required to adopt reasonable security precautions to protect their technology. E.I. duPont deNemours & Co. v. Christopher, 431 F.2d 1012, 1016-17 (5th Cir. 1970), *cert. denied*, 400 U.S. 1024 (1971).

[23] Adelman & Jaress, *Inventions and the Law of Trade Secrets After* Lear v. Adkins, 16 WAYNE L. REV. 77, 88-91 (1969).

tion, explain why patent systems, which protect inventions after disclosure, have been widely enacted.[24] The benefits of the patent system, however, must be weighed against its costs.

Under the patent system, one who is unaware of the patentee's work is nevertheless precluded from independent creation and exploitation. This ban on reinvention and use, however, does not extend to competing inventions. Accordingly, the fear that someone will invent a competing product or process stands as something of a check on the prices charged by the patentee because, assuming perfect information, competing technology will be invented only if the patentee overcharges for his invention.[25] Despite this check, the patentee's power to exclude independent reinventors as well as free-riders ordinarily allows him to capture more of his invention's value than he would be able to capture under the trade secret property system.[26]

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[24] The public disclosure of inventions required by the patent system has important benefits in addition to the fact that it stimulates further technological creation. Consumers frequently benefit from such disclosure because a patentee is often unable to capture the full value of his invention. For example, an invention may become useful in a second field owing to a new technological development, but the new use may be free of the original patent. Even if the original patent would cover the new use, market conditions may make the price discrimination necessary to capture the value of the new use difficult or impossible. Professor Arrow argues that the owner of a patent on a new invention is unable to capture the full value of the invention, and therefore that a free enterprise economy will underinvest in research and development. Arrow, *supra* note 21, at 616-19. This view must account, however, for the possibility that in some circumstances inventors who hold patents may capture more than the social value of an invention. *See* text accompanying notes 37, 64-70 *infra*.

[25] Professor Machlup views any attempt to invent around a patent as the result of a defect of the patent system. F. MACHLUP, *supra* note 3, at 51. But when an inventor deliberately sets out to make an invention that is a mere substitute for an existing patented invention, it is the result of a failure in bargaining rather than a consequence of any defect in the patent system. Unless the parties estimate the cost of inventing around the patent differently, an agreement to license the existing invention, rather than the development of a new invention, should occur. A model of inventing that excludes the possibility of licensing as an alternative to competitive invention is found in Needham, *Market Structure and Firms' R & D Behavior*, 23 J. INDUS. ECON. 241 (1975).

[26] Consider the example discussed in note 20 *supra*. Regardless of the cost of developing the technology under a patent system, the return to the owner is $\frac{3a^2}{b}$ and the imputed royalty rate is $\frac{a}{2}$. Unless the cost of reinvention is greater than the return to a new entrant, $\frac{3a^2}{4b}$, one who sought to protect the technology through trade secrecy would be forced to charge an imputed unit royalty less than $\frac{a}{2}$ in order to forestall entry. Thus, the return to the inventor under the patent system is greater than it would be under the trade secret system (assuming that a competing invention could not be created at a cost of $\frac{3a^2}{4b}$ or less).

But since the patent system compels disclosure, limiting the patentee's power to control of free-riding alone would be impractical. Anyone exposed to a patented idea would automatically be a potential free-rider. Aspiring inventors would have to avoid exposure to patented ideas, an exercise which, pushed to the extreme, would require isolation from all new ideas. This is too silly to contemplate even if potential inventors could accurately assess the value of the right to reinvent and successfully overcome the practical problem of demonstrating that the invention was in fact independent and not the result of exposure to the original.[27]

The patent system, then, lacks the self-regulating control of return present in its counterpart. To compensate for the absence of this important check on the patentee's power, patent systems generally substitute an administrative control mechanism.[28] In the United States, a patent may issue only for those inventions that are not obvious to one skilled in the art;[29] those inventions that can with reasonable assurance be reproduced by a skilled artisan are protected, if at all, only by the trade secret system. The patent system, then, forces members of society to relinquish their right to reinvent and use, but it does so only when reinvention would be unlikely and thus the threat of reinvention would probably not serve as a practical check on the patentee's monopoly return.[30]

[27] For these reasons, patent laws generally do not permit independent reinvention as a defense to a patent infringement suit. *See, e.g.*, Patent Law of Jan. 2, 1968, art. 6, [1968] Bundesgesetzblatt [BGBl] I 2 (W. Ger.); Royal Decree No. 1127, Juno 29, 1939, art. 2, Gazotta Ufficiale [Gaz. Uff.] No. 189 (Aug. 14, 1939), 50 Legislazione Italiana [Leg. Ital.] 1476 (Italy). Some foreign patent statutes permit the continued use of infringing articles constructed prior to the issuance of the patent. For example, § 58 of the Canadian Patent Act reads in part as follows:

> Every person who, before the issuing of a patent has purchased, constructed or acquired any invention for which a patent is afterwards obtained under this Act, has tho right of using and vending to others the specific article, machine, manufacture or composition of matter patented and so purchased, constructed or acquired before tho issue of the patent therefor, without being liable to the patentee . . . .

CAN. REV. STAT. c. P-4, § 58 (1970). The French patent law contains a similar provision. Law No. 68-1 of Jan. 2, 1968, art. 31, [1968] Journal Officiel [J.O.] 13 (Jan. 3, 1968), [1968] Dalloz-Sirey, *Législation* [D.S.L.] 68 (Fr.).

[28] *See* F. MACHLUP, *supra* note 3, at 8.

[29] 35 U.S.C. § 103 (1970); *see* Sakraida v. Ag Pro, Inc., 425 U.S. 273, 279-80 (1976); Dann v. Johnston, 425 U.S. 219, 225-30 (1976); Kitch, Graham v. John Deere Co.: *New Standards for Patents*, 1966 SUP. CT. REV. 293, 297-303.

[30] The law gives inventors the freedom to elect either patent protection or trado secrecy. *See* Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 474 (1974). The view that the law should

Nevertheless, owing to its prohibition on reinvention and use, a patent system retains an aura of odious monopoly absent in a pure property rights system.[31] Consider an example. The builder of a bridge, like the possessor of a trade secret, can prevent others from using it.[32] Anyone can build a second bridge, however, just as anyone can independently rediscover a process. Consequently, although the value of the bridge to society may greatly exceed its cost, the owner may be unable to capture its full social value owing to the threat of entry. But if the bridge owner could secure a franchise prohibiting anyone from building a second bridge,[33] he could capture a

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discourage the election of secrecy because disclosure contributes to the advancement of technology was rejected by the *Kewanee* Court. *Id.* at 484-91. The Court was clearly influenced by the administrative difficulty of distinguishing between obvious and nonobvious inventions. *Id.* at 492. These difficulties could be resolved by a modest adjustment in remedies. I have argued elsewhere that those who choose to protect inventions through secrecy should usually be granted compensatory relief only, and denied injunctive relief, regardless of whether the invention is obvious or nonobvious. Adelman, *Secrecy and Patenting: Some Proposals for Resolving the Conflict*, 1 APLA Q.J. 296, 307-10 (1973). The dissenting Justices in *Kewanee* suggested a somewhat more drastic adjustment, arguing that remedies should be limited to damages for breach of a confidential relationship. 416 U.S. at 498-99. *See generally* Adelman, *supra* at 293-301. The economics of the disclosure requirement are discussed in D. Needham, The Incentive Theory of Patent Protection 124-41 (1965) (unpublished Princeton University Ph.D. thesis).

[31] Professor Machlup explained the distinction between "property" and "monopoly" by comparing the homeowner to the patentee: the homeowner has a property right in his house—for example, he may exclude trespassers—but he may not prevent another from constructing an identical house; a patentee, in contrast, has both the property right to exclude and the monopoly right to prevent independent development. F. MACHLUP, *supra* note 3, at 53-54. This distinction is often overlooked. *See, e.g.*, United States v. Line Material Co., 333 U.S. 287, 329 (1948); United States v. Dubilier Condenser Corp., 289 U.S. 178, 186 (1933).

It is worth noting the frequent assertion that a major weakness of the patent system is that it reduces output of the patented product or use of the patented process, thereby causing a "deadweight" loss in welfare. *See* W. BOWMAN, *supra* note 8, at 53; F. MACHLUP, *supra* note 3, at 55. This welfare loss, however, is inherent in any protective mechanism—trade secret, license of right, etc.—for the private production of public goods such as inventions. *See* Posner, *The Social Costs of Monopoly and Regulation*, 83 J. POL. ECON. 807, 807-08 (1975).

[32] The bridge example is part of the history of the famous marginal cost controversy. *See* Hotelling, *The General Welfare in Relation to Problems of Taxation and of Railway and Utility Rates*, 6 ECONOMETRICA 242, 260-63 (1938). The owner of the bridge possesses a natural monopoly—increasing the use of the bridge reduces the average cost of use (assuming that the bridge is so large that there would be no congestion even if the bridge were toll free).

Professor Hotelling argues that the fixed costs of natural monopolies should be financed by the government. *Id.* at 260-63. *But see* Coase, *The Theory of Public Utility Pricing and its Application*, 1 BELL J. ECON. & MANAGEMENT SCI. 113, 118-24 (1970). A similar argument can be made in favor of government subsidy of inventive activity. *See* W. NORDHAUS, INVENTION, GROWTH, AND WELFARE 86-90 (1969).

[33] *Cf.* Charles River Bridge v. Warren Bridge, 36 U.S. (11 Pet.) 420, 547-50 (1837) (denying claim based on charter to an implied franchise right). *See generally* Baker, *Competition and Regulation:* Charles River Bridge *Recrossed*, 60 CORN. L. REV. 159, 165-77 (1975).

considerably greater share of its social value[34] (as long as his franchise were not subject to rate control). Similarly, consumers may pay more for an invention that is patented than they would in the absence of a ban on reinvention because the patentee is given a franchise—that is, a monopoly—along with a property right. As with the bridge franchise, this overpayment could be administratively controlled with a system of rate regulation, but the difficulties of operating such a system in the patent area would probably outweigh its advantages.[35] Accordingly, the patent system has opted for a simpler scheme—the patent validity requirement—that attempts to separate those inventions which will probably not be reinvented from those which probably will be. Theoretically at least, the scheme undercompensates those who make a product invention deemed obvious, which is left unprotected by the law of trade secrets.[36] Conversely, it overcompensates those who make an invention deemed nonobvious if the return over its patent life is greater than the cost to society of reinvention.[37] To avoid the improper allocation of social value, then, the

[34] The entire overpayment by consumers may not be captured by the bridge owner, however, since the cost of competing for the franchise may devour his excess return. That firms which compete for monopolies when a franchise is involved are engaged in a wasteful competitive activity is extensively developed in Posner, *supra* note 31.

[35] In a recent study, two economists compared the effects of a hypothetical regulatory scheme with those of the current English patent system. C. TAYLOR & Z. SILBERSTON, THE ECONOMIC IMPACT OF THE PATENT SYSTEM (1973). The study concluded that although a scheme including compulsory licensing and rate regulation would lower some prices, it would also result in less market security, significantly less research in some fields, less public disclosure and transfer of technology, and increased administrative costs. *Id.* at 349-50; *cf. In re* Permian Basin Area Rate Cases, 390 U.S. 747, 757-58 (1968) (individual regulation of natural gas well rates administratively impossible); Schwartz, *supra* note 4, at 727-30 (discussing problems in determining rates for air pollution control devices).

[36] The trade secret system does provide an inventor with a limited headstart in the market, even when a product invention is involved. Adelman & Jaress, *supra* note 23, at 88-91. In addition, absent some form of legal protection, some market structures may create a greater natural headstart for an inventor, a possibility which has led economists to attempt to determine empirically whether certain market structures are more conducive than others to inventive activity. A review of the relevant literature may be found in Kamien & Schwartz, *Market Structure and Innovation: A Survey*, 13 J. ECON. LIT. 1, 19-24 (1975). That certain market structures may encourage invention, however, can be viewed as an argument for property rights in inventions. The patent system's 17 year lead time, *see* 35 U.S.C. § 154 (1970), for example, is independent of industrial structure. Thus, under the patent system, inventors will not favor one industry over another solely because its market structure creates a longer lead time. *See* W. Lovett, Patents and Headstarts: A Study of the Polyolefin Plastics (1969) (unpublished Michigan State University Ph.D. thesis).

[37] The active competition for these valuable monopolies may result in multiple independent inventions, necessitating the use of a priority rule. In most countries, priority is given to the

patent validity system must accurately distinguish between obvious and nonobvious inventions.

II

Ineffective enforcement of the patent validity requirement would create many opportunities for inventors to seek out obvious inventions, the cost of which would be considerably less than the value of the seventeen-year monopoly provided by the patent law.[38] Such inventors would, in effect, be seizing monopoly control of obvious developments rather than obtaining the rightful reward for unique creations, and in doing so would generate a socially wasteful rivalry for control of the high profits. In the United States, the Patent Office through its application process[39] and the federal courts through patent infringement suits[40] share responsibility for effecting the patent validity requirement.[41] Although designed to be complementary, this enforcement procedure works better in theory than practice. In *Graham v. John Deere Co.*,[42] the Supreme Court lamented the "notorious difference between the standards applied by the Patent Office and by the courts,"[43] and suggested that the discrepancy was largely owing to the enormous administrative strain on the application process.[44] Judicial scrutiny of patent validity through infringement

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first to file, *e.g.*, Law No. 68-1 of Jan. 2, 1968, art. 1, [1968] J.O. 13 (Jan. 3, 1968), [1968] D.S.L. 68 (Fr.); Patent Law of Jan. 2, 1968, art. 3, [1968] BGBl I 2 (W. Ger.); Royal Decree No. 1127, June 29, 1939, art. 4, Gaz. Uff. No. 189 (Aug. 14, 1939), 50 Leg. Ital. 1476 (Italy), while in the United States it is given to the first to invent, *see* 35 U.S.C. § 102(g) (1970). The risk of inventing a patentable technology but losing out in a priority contest increases as the perceived reward exceeds the cost of invention. This risk of loss increases the cost of invention because the premium on being the first inventor may encourage a crash development program. The result is a waste of real resources. A simple model describing the distortion is found in Barzel, *Optimal Timing of Innovations*, 50 REV. ECON. STAT. 348 (1968). *See generally* Kamien & Schwartz, *Timing of Innovations Under Rivalry*, 40 ECONOMETRICA 43 (1972); Ruff, *Research and Technological Progress in a Cournot Economy*, 1 J. ECON. THEORY 397, 403-11 (1969); Scherer, *Research and Development Resources Allocation Under Rivalry*, 81 Q.J. ECON. 359 (1967).

[38] 35 U.S.C. § 154 (1970).

[39] *See id.* § 131.

[40] *See* 28 U.S.C. § 1338 (1970).

[41] *See* F. MACHLUP, *supra* note 3, at 8; Kitch, *supra* note 29, at 341-46.

[42] 383 U.S. 1 (1966).

[43] *Id.* at 18. An economist has claimed that "[i]f and when the Patent Office administers the standard of patentability indicated by the Supreme Court, the number of patents should be reduced at least one-half." F. VAUGHN, THE UNITED STATES PATENT SYSTEM 229 (1956) [hereinafter F. VAUGHN, PATENT SYSTEM].

[44] 383 U.S. at 18.

litigation, therefore, is crucial to the avoidance of the problems engendered by the issuance of patents for obvious inventions.

Because patents may be challenged by infringers and invalidated in the courts at any time, their continuing validity is frequently in doubt. Once a court has been persuaded that a patent is invalid, however, the public rather than the successful challenger reaps the benefits of the destruction of the patent monopoly:[45] the infringer who successfully litigates the validity issue is unable to capture for himself even a part of the benefit because the invention is now available for use by anyone.[46] This is not to say that the market is without incentives to the potential challenger. An infringer may indirectly benefit from a patent challenge because he is paid a monopoly rate by consumers while the challenge is taking place. The problem is that the extent of an infringer's profit may depend on the behavior of the patentee before and while his patent is under attack. A patentee may thus be able to control the conduct of potential challengers by manipulating the level of income an infringer receives from the public. This latent capacity suggests that the law should be concerned with controlling practices undertaken by patentees to inhibit challenges to their patents.

A. Exploitation Solely by the Patentee

One way that a patentee can inhibit challenges to his patent is through the manner in which he exploits it. When a patent covers the only practical process for making a consumer product and the inventor is a manufacturing patentee (one who decides to exploit the invention himself), he examines the market to determine the price that will maximize his profits. If the patent is valid, the patentee presumably receives his proper reward when society pays that price. But if the probability of validity is, let us say, 50%, then the paten-

[45] Once a patent has been invalidated in one proceeding, the patentee is usually barred from bringing an infringement suit against other potential defendants. Blonder-Tongue Laboratories, Inc. v. University of Ill. Foundation, 402 U.S. 313, 350 (1971). Before *Blonder-Tongue*, which overruled Triplett v. Lowell, 297 U.S. 638 (1936), mutuality of estoppel principles were applied in patent cases, *see id.* at 641-45, and consequently only the successful defendant benefited from the invalidation.

[46] To the extent that the infringer's entry enables it to acquire specialized resources on which quasi-rents would be paid, the successful infringer would be free to collect those rents.

In contrast with the patent system, trade secret protection bestows upon someone who enters the market through reinvention a property right similar to that of the first inventor. The value of this right may be sufficient to repay the investment required for reinvention.

tee's compensation from society would be excessive. If necessary to avoid a challenge, a patentee in this situation should be willing to yield up to 50% of his monopoly profit, setting litigation costs aside for the moment. In this way, appreciation of the probability of a successful challenge would bring the patentee's reward into line with his contribution. But this may not forestall a challenge if the infringer views the challenge itself as profitable, that is, if he can capture a share of the monopoly profit before a successful challenge opens the field to all other competitors.[47] If indeed the challenger can get payment from the public, then the profitability of a challenge would depend on the amount of monopoly profit captured, the cost of litigation, the probability of success, and the delays inherent in the adjudicative process.[48] Specifically, the challenge would be profitable if the probability of keeping the captured monopoly profit multiplied by the magnitude of that profit exceeded the cost of the challenge. This last item, the expense of litigation, serves to check challenges to some extent, but its effectiveness as a prophylactic is tempered by the extent to which court delays give a challenger time to capture more monopoly profit.

A patentee could respond to a challenge by lowering his prices and thereby decreasing the monopoly profit captured by the challenger, a reduction that could render challenge unprofitable. Of course, there is a limit on a patentee's willingness to reduce his own profits. Certainly before the appearance of an actual challenger, a patentee would be unlikely to reduce his monopoly profit to the level necessary to discourage challenges. Once a challenge materializes, however, the patentee may be well-advised to avoid a definitive test

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[47] The total monopoly profit captured will remain unchanged if the patentee reduces his output to compensate for that of the challenger or the challenger discovers a new market that shifts the demand curve to the right. If the challenger does not discover a new market and the patentee maintains his previous level of output, the calculation becomes more complex: the increase in production will cause price to fall, decreasing the overall monopoly profit paid by consumers. In addition, the challenger faces the prospect of having to make up the profits lost by the patentee and captured by consumers in the event the suit is lost. *See* note 49 *infra*.

[48] If the probability of validity is P and MP is the monopoly profit per year captured by the challenger, Y is the number of years of litigation, and C_l is the total cost of litigation to the challenger, then a challenge will be profitable if $(MP)(1-P)(Y) > C_l$, that is, if the value of the monopoly profit captured by the challenger each year, diminished by the probability that all of it will have to be returned to the patentee, multiplied by the number of years of the challenge, is greater than the cost of the challenge. The equation omits the loss of the value of specialized resources owned by the challenger in the event the suit is lost and an injunction issues against further infringement.

of the patent's validity. By reducing his prices to force those of the challenger down, the patentee could diminish both the infringer's profits and, as a consequence, the fund used by the latter to finance the challenge.[49]

Ordinarily, there is little doubt about the propriety of price cuts by a monopolist.[50] But aggressive price reductions designed to discourage patent challenges are likely to harm the public far more in the long run than a reduction aimed at an ordinary competitor.[51] At a minimum, this likelihood suggests that the patentee should be able to meet, but not beat, the price charged by the challenger during the period of the challenge. Although such a rule would increase the short run cost to consumers, society stands to benefit in the long run from a challenger's success. The more serious difficulty is that the rule would be cumbersome to administer and might be of only limited efficacy. For example, price cuts might in fact be justified by lower production costs[52] or by differences between the challenger's product and that of the patentee, thereby making it difficult to determine whether the patentee intended to meet or to beat the challenger's price.[53] The rule could be easily circumvented by a patentee's decision to upgrade his product while maintaining the same price or by a vigorous sales effort—both of which would reduce the challenger's share or force him into excessive spending in an attempt to ward off the patentee and preserve his portion of the monopoly.

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[49] Theoretically, damages suffered by the patentee should include any reduction in profits on the patentee's sales resulting from the infringer's activities. This element of damages is rarely awarded to a successful patentee, however, perhaps because of the strict proof requirement. In Boesch v. Gräff, 133 U.S. 697 (1890), the Court held: "When . . . a plaintiff seeks to recover because he has been compelled to lower his prices to compete with an infringing defendant, he must show that his reduction in prices was due solely to the acts of the defendant, or to what extent it was due to such acts." *Id.* at 706.

[50] *See* Telex Corp. v. IBM, 510 F.2d 894, 926-28 (10th Cir.), *cert. dismissed per stipulation*, 423 U.S. 802 (1975).

[51] Areeda & Turner, *Predatory Pricing and Related Practices Under Section 2 of the Sherman Act*, 88 HARV. L. REV. 697, 697-700 (1975). Areeda and Turner's economic analysis, but not their claim that some price cuts ought not to be allowed, provoked criticism. *See* Scherer, *Predatory Pricing and the Sherman Act: A Comment*, 89 HARV. L. REV. 869 (1976); Areeda & Turner, *Scherer on Predatory Pricing: A Reply*, 89 HARV. L. REV. 891 (1976); Scherer, *Some Last Words on Predatory Pricing*, 89 HARV. L. REV. 901 (1976).

[52] The many difficulties inherent in a cost-justification defense are illustrated in United States v. Borden Co., 370 U.S. 460, 467-72 (1962).

[53] A similar problem has arisen in the administration of the meeting competition defense to a prima facie violation of the Robinson-Patman Act, 15 U.S.C. §§ 13-13c, 21a (1970). *See* Calloway Mills Co. v. FTC, 362 F.2d 435, 441-44 (5th Cir. 1966).

Practically speaking, then, the benefits and effectiveness of a change in the law governing a patentee who exploits his own monopoly would be questionable at best.

B. Exploitation Solely By Licensees

The situation is different when a nonmanufacturing patentee —one who does not exploit the invention himself—is willing to use the licensing mechanism to assure that peace will reign. This end can be achieved in various ways. One method is to inhibit challenges by making it more attractive to license than to challenge. A challenge will only be profitable if the royalty charged by the patentee, in light of the probability of invalidity, is greater than the cost of litigation to the challenger.[54] The patentee, then, can directly reduce the risk of challenge by lowering the royalty rate at which he offers licenses. To the extent that price falls in response to the reduction in royalty rate, the public shares in the monopoly profit. But to the extent the fund available to finance future challenges is correspondingly diminished, the public is harmed by the inhibition of socially useful challenges. By licensing at the reduced royalty rate all those who would still find it profitable to challenge, the patentee can organize what amounts to a cartel to exploit the patent.[55]

The patentee can also inhibit challenges through restrictive licensing practices aimed at bribing the most likely challengers. For example, if the invention can be used in several distinct fields, the patentee could engage in royalty sharing through field-of-use licens-

[54] If P, Y, and C_l are defined as in note 48 *supra*, R_m is the profit-maximizing unit royalty rate, and X is the challenger's output, then a challenge will be inhibited when $(1\text{-}P)(R_m)(X)(Y) < C_l$. This formula assumes that the license will not be lost if the licensee's challenge is unsuccessful. At least two circuit courts have held that if the licensee wishes to retain its license in such event, it must pay royalties pending a final determination of the patent's validity. Nebraska Eng'r Corp. v. Shivvers, 557 F.2d 1257, 1260 (8th Cir. 1977); Warner-Jenkinson Co. v. Allied Chem. Corp., 193 U.S.P.Q. 753, 757 (2d Cir. Apr. 13, 1977). Continued payment of royalties, however, does not deprive the licensee of standing to challenge the patent's validity, Warner-Jenkinson Co. v. Allied Chem. Corp., 193 U.S.P.Q. at 756; *see* Nebraska Eng'r Corp. v. Shivvers, 557 F.2d at 1259, and in the event the patent is found invalid the licensor may be required to return royalties paid to the licensee pendente lite. Warner-Jenkinson Co. v. Allied Chem. Corp., 193 U.S.P.Q. at 757; Atlas Chem. Indus., Inc. v. Moraine Prods., 509 F.2d 1, 4-7 (6th Cir. 1974).

[55] This cartel would be designed to exploit the monopoly profit inherent in the patent monopoly itself, and not one which, although ostensibly a patent licensing program, is in reality a scheme for reducing output of products or processes not controlled by the patent. For a discussion of licensing arrangements that are covers for such broad cartels, see Furth, *Price-Restrictive Patent Licenses Under the Sherman Act*, 71 HARV. L. REV. 815, 830-33 (1958).

ing. Each licensee could be given an exclusive license in one field with the royalty rate fixed at less than the profit-maximizing rate for that field, the difference being the bribe paid for refraining from attacking the patent.[56] Another restrictive practice is for the patentee to require each licensee to sell the patented product at the full monopoly price while charging less than the appropriate monopoly royalty. Again, the differential between the monopoly profit captured by the licensee and the royalty paid the patentee serves as a bribe to potential challengers. The bribe is only effective, however, if the amount received by the licensee over the life of the patent exceeds what he could expect to earn by challenging the patent,[57] which is not always simple to achieve. For example, there is a danger that nonprice competition among licensees may cut into their share of the monopoly profit. The patentee, therefore, may be forced to impose quantity limitations on licensees' output in order to curb excessive sales efforts or plant investment. Moreover, the effectiveness of the bribe might be reduced if barriers to entry were low. With easy entry, there may be many potential challengers, each of whom would have to be given a share of the monopoly profit.[58]

The most important question raised by the potential for bribery in some licensing practices, however, is whether a patentee should be able to inhibit challenges by selectively refusing to license. In some circumstances, refusal to license may serve the same function as a licensing provision requiring licensees to sell the patented product at a specified price. Thus, if the number of licensees is limited, they may be able to engage in oligopolistic coordination[59]—like the licen-

[56] Adelman & Juenger, *supra* note 13, at 298-99.

[57] If R is the reduced royalty charged each licensee and O_l is the licensee's yearly output, the profit to be gained by a challenge is (1-P) (R) (O_l) (Y) − C_l. If this exceeds (R_m − R) (O_l) (T), where T is the term of the license, a challenge will be profitable. *See* Baxter, *Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis*, 76 YALE L.J. 267, 329-39 (1966). For a similar analysis in the context of ordinary cartels, see Orr & MacAvoy, *Price Strategies to Promote Cartel Stability*, 32 ECONOMICA 186 (1965).

[58] An economic analysis of a regulated industry in which prices are fixed but entry is open is found in Plott, *Occupational Self-Regulation: A Case Study of the Oklahoma Dry Cleaners*, 8 J. LAW & ECON. 195 (1965).

[59] One of the central problems facing any formal or informal cartel is the entry of new competitors. F. SCHERER, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE 219-24 (1970). *See generally* D. NEEDHAM, *supra* note 20, at 97-111. An oligopoly, to the extent that it successfully initates an informal cartel by raising prices and reducing output, is similarly threatened by entry.

sees under the tetracycline patent[60]—or may for other reasons be unlikely to compete.[61] If as a result the price of the product can be kept sufficiently high that the differential between the monopoly profits taken by licensees and the royalties paid to the patentee exceeds the licensees' costs of litigating a challenge, but not so high that an outsider would find a challenge profitable, challenges will be effectively inhibited. This requires, however, that the patentee's power to refuse to grant any additional licenses remain unhampered: as the licensee pool expands it becomes exceedingly unlikely that the price level can be maintained, and that all licensees can be assured a sufficient share of the monopoly profit to forestall challenges. Particularly if combined with other restrictive practices, selective refusals to license undermine the effectiveness of the patent system by inhibiting socially useful challenges.

C. Exploitation by the Patentee and Licensees

The problems are more complex if the patentee is both licensing and vigorously exploiting the invention. In such circumstances, the purpose of a price-fixing provision or selective refusal to license is ambiguous.

Among the reasons a patentee might have for not reserving all rights to himself are lack of capital, reduction of risk, and the lower overall cost resulting from the licensees' entry into the business. For the patentee, these advantages must be balanced against a loss of control over the price at which the licensees market the invention. In essence, licenses are long-term contracts that typically incorporate a fixed unit royalty or one based on a fixed percentage of the licensee's gross revenues. Although renegotiation of the "contract" to reduce the royalty rate is possible if demand falls or production costs increase, a licensee is unlikely to agree to increase the royalty rate if demand increases or costs decrease. Consequently, only a patentee who is free to adjust the price at which the licensee sells the product can maximize the monopoly return from his own sales based on current demand and cost conditions.[62] In such a situation, any increase

[60] *See* North Carolina v. Chas. Pfizer & Co., 384 F. Supp. 265, 285 (E.D.N.C. 1974), *aff'd*, 537 F.2d 67 (4th Cir.), *cert. denied*, 429 U.S. 870 (1976).

[61] There may be little need for oligopolistic coordination among licensees if they are likely to exploit different territories or classes of customers.

[62] *But see* Baxter, *supra* note 57, at 333-35.

in the licensees' monopoly profit is only an incidental effect of the price-fixing clause so long as the patentee's goal in adjusting the price is to increase his own monopoly profit rather than to inhibit patent challenges.[63] Similarly, selective refusals to license by a patentee who is actively exploiting the patent may be designed to maintain his control over the size of his market share. Alternatively, his intent may be to maximize his return on an existing share by taking advantage of oligopolistic coordination by a smaller number of licensees. In either case, the patentee's principal goal is to capture the value of his patent, rather than to inhibit challenges.

A rule designed to limit price-fixing or refusals to license, therefore, could deprive a manufacturing patentee of a part of his proper share of the social value of his invention. It could also lead to a total refusal to license, a socially undesirable result. Alternatively, permitting manufacturing patentees to fix prices and to refuse to license while limiting that right for nonmanufacturing patentees would put the former into a favored class of patent holders lawfully empowered

[63] Assume that the industry demand curve is linear, $p = a - bq$, and that all firms havo the same long-run marginal costs, C. Profit will be maximized when marginal revenue equals marginal cost:

$$\frac{d}{dq}((a - bq)q) = C$$
$$a - 2bq = C$$
$$q = \frac{a - C}{2b}.$$

The profit-maximizing price, then, would be

$$P_m = a - b\left(\frac{a - C}{2b}\right) = \frac{1}{2}(a + C),$$

and the profit-maximizing royalty (R_m) would be

$$R_m = P_m - C$$
$$= \frac{1}{2}(a + C) - C$$
$$= \frac{1}{2}(a - C).$$

If the royalty charged (R) were less than R_m, but the price were maintained at P_m, then the monopoly profit taken by the licensee, if the output of the licensee were q_l, would be $(R_m - R)q_l$. The monopoly profit captured by the patentee, on the other hand, would include the profit-maximizing royalty on his own production (q_p) as well as the actual royalty collected on the licensee's production, or

$$Rq_l + R_m q_p.$$

See Baxter, *supra* note 57, at 331-32.

to bribe potential challengers with monopoly profits. Moreover, a patentee who must resort to licensing would lose the flexibility to maximize his return by adjusting to changes in conditions and consequent changes in the profit-maximizing royalty rate unless he held a large share of the market. If he did hold a large share, it would be unlikely that even a carefully drafted rule would affect his decision on whether to license.

III

As a consequence of the patent system's prohibition on reinvention and use, private parties can undermine the economic function of the system in ways other than by tampering with the patent validity requirement. A patentee's private return should be directly related to the social value of his invention, but his power to exclude independent rediscovery could result in certain inventions having different private values depending on who owned their patents. Consider a manufacturing firm that makes and sells widgets using a costly and complex set of tools. Suppose an inventor then designs a new set of tools that can manufacture the same widgets at half the cost. Under perfect competition, the value of the old tools would be automatically reduced by half. If the patent on the new tools is exploited by one other than the owner of the old tools, the loss in value of those old tools would presumably not be considered in setting a profit-maximizing royalty rate on the new tools aimed at capturing substantially all the social value of the invention.[64] But one who owned

[64] The royalty rate would depend on the derived demand for new machines needed to replace old machines as they wear out and for new machines needed to make the additional widgets that could be sold because the price of widgets would drop. For example, assume that the only cost of making widgets is the physical depreciation of the machine, or C per widget. If the demand for widgets is linear, $p = a - bq$, the output of widgets under competitive conditions, q_o, is determined by $a - bq_o = C$, and thus $q_o = \frac{a - C}{b}$. If a new entrant whose depreciation cost is $\frac{C}{2}$ produces an additional q_e widgets, the price of widgets, P, will fall to $a - b(q_o + q_e)$. The entrant's total revenue, $(P)(q_e)$, will be $aq_e - bq_oq_e - bq_e^2$, and the entrant's marginal revenue will be

$$\frac{d}{dq}(aq_e - bq_oq_e - bq_e^2) = a - bq_o - 2bq_e.$$

The entrant's profit will be maximized when his marginal revenue equals his marginal cost:

both the old tools and the patent on the new ones would consider the effect of his invention on the value of his old tools.[65] To protect the value of his existing equipment, this patentee would fix a higher royalty rate on the new tools than another would: the higher the rate, the lower the loss on the old tools.[66] In the extreme case, the profit-maximizing royalty rate would be equal to the difference in the manufacturing costs of the two sets of tools, which would effectively suppress sales of the new tools. The private value of owning the patent, then, would be considerably greater than the social value of the invention.

$$\frac{C}{2} = a - bq_o - 2bq_e$$

$$= a - b\left(\frac{a - C}{b}\right) - 2bq_e$$

$$= a - a + C - 2bq_e$$

$$2bq_e = \frac{C}{2}$$

$$q_e = \frac{C}{4b}$$

The imputed royalty captured by the entrant is price less cost:

$$P - \frac{C}{2} = a - b(q_o + q_e) - \frac{C}{2}$$

$$= a - b\left(\frac{a - C}{b} + \frac{C}{4b}\right) - \frac{C}{2}$$

$$= a - a + C - \frac{C}{4} - \frac{C}{2}$$

$$= \frac{C}{4}$$

Thus the machines will be sold at $\left(\frac{C}{2} + \frac{C}{4}\right)$ multiplied by the number of widgets they are capable of making, and the long-run marginal cost of widgets will be $\frac{3}{4}C$, the new price under competition as long as an outsider holds the patent.

[65] The value of existing machines would decline because the price of widgets would fall to the new and lower long-run marginal cost, thereby lowering the derived demand for the specialized inputs needed to make them. Specifically, under the assumptions used in note 64 *supra*, the value of each existing machine would fall from C to $\frac{3}{4}C$, multiplied by the number of widgets the machine could make before it was worn out.

[66] Instead of maximizing the profit from the patented machines, a patentee who owned competing old machinery would seek to maximize profit from the new machines loss the loss in value of the old machines.

Theoretically, of course, the inventor should sell all of the old machines before the world learns of the invention. In addition, to truly maximize his return he should, if possible, sell all other old machines short. *See generally* Hirshleifer, *The Private and Social Value of Information and the Reward to Inventive Activity*, 61 AM. ECON. REV. 561 (1971).

This private value dependence on the identity of the patentee also arises if the property affected by the new invention is itself a patent. If two competing patents are owned by different firms, each individual firm's efforts to capture the market could drive down the price to the point at which the second best patent would have zero value and the best patent would have a value equivalent to its economic superiority over its competitor.[67] The rational behavior for duopolists, however, is to form a cartel or to merge. If combining ownership of the patents is permitted, the full social value of the inventions can be privately appropriated by and divided between the owners. In that event, only the lowest cost invention or the better product would be exploited. Similarly, if combination were forbidden, but the competing inventions were developed and patented by the same inventor, he could capture the full social value of the better patent by suppressing the use of its competitor.[68] But although the character of patents as property suggests that the patentee should be able to exploit his monopoly, the patentee's property right provides no basis for allowing competing patents to coalesce with the consequent distortion of their value[69]—the patentee could avoid absorbing the costs associated with his second best invention.

Protecting the value of competing property, then, whether or not it is patented, is not a legitimate economic function of the patent system. Theoretically, at least, suppression of use occurs whenever the price of a patentee's invention reflects the effect of its exploitation on the value of the patentee's own competing property.[70] When that

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[67] Under the trade secret system, in contrast, the private value of two or more competing inventions, regardless of who owns them, is always limited by the cost of reinventing the least expensive invention. Thus, the rewards of combining competing secret inventions are lower than those of combining competing patents. To the extent that consolidation of competing secret technologies leads to overcharging for technology, it stimulates reinvention. On the other hand, if two companes with extensive unpatented technology and high market shares combine their technology, a serious cartel problem may arise. Honeywell, Inc. v. Sperry Rand Corp., 180 U.S.P.Q. 673, 740-43, 747 (D. Minn. 1973).

[68] F. MACHLUP, *supra* note 3, at 11-12. In addition, when the inventions are covered by a dominant patent, only the owner has a real incentive to discover improvement inventions. Thus the owner is likely to accumulate competing patents. This may serve to extend the original monopoly and may explain why monopolies based on dominating patents have tended to persist long after the basic patent has expired. *See* notes 96-97 *infra*.

[69] *See* W. BOWMAN, *supra* note 8, at 201. A general argument based on incentives to invent provides no conclusive answer to the question whether the law should allow competing patents to coalesce. *See* McGee, *Patent Exploitation: Some Economic and Legal Problems*, 9 J. LAW & ECON. 135, 144-48 (1966).

[70] *See generally* F. VAUGHAN, PATENT SYSTEM, *supra* note 43, at 227-60. There is an extensive literature on patent suppression. *See* Gharrity, The Use and Non-Use of Patented Inven-

competing property consists of capital goods incorporating the second best technology, the patentee can suppress the invention to protect the value of those goods. When the competing property is a patent, the patentee can price the superior invention at a level that disregards the competitive potential of the second best invention. If, however, the competing inventions are in different hands, the owner of the superior invention could be forced to price his invention at a lower rate. Consequently, the public would pay different rates for the best invention depending on who owned it.

IV

The patent system, then, allows a patentee to appropriate to himself more than a proper share of his invention's social value in two ways. First, he can seek to inhibit challenges to the validity of his patent by bribing probable challengers with a portion of the monopoly profit of the invention. Second, he can suppress the use of a patented invention in order to charge an excessive rate on a superior patent or in order to protect the value of competing nonpatented property. Both of these methods are unfortunate consequences of the unique feature that distinguishes patent systems from their tangible property analogues—the prohibition on reinvention and use. Both are worthy candidates for judicial scrutiny. The balance of this Article proposes rules to prevent excessive returns to patentees and then suggests, by reference to the courts' development of the misuse doctrine, that application of the rules is well within the judicial competence.

A. Preventing the Inhibition of Challenges: The "One License" Rule

The current legal status of price-fixing licenses and refusals to license is complex. The latter is generally believed to be lawful;[71] even price-fixing has never been authoritatively banned by the Supreme Court.[72] The problems described above, however, indicate that legal controls on both are overdue.

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tions 1-26 & bibliography collected at 312-20 (1966) (unpublished Johns Hopkins University Ph.D. thesis).

[71] *See* L. SULLIVAN, HANDBOOK OF THE LAW OF ANTITRUST 525-26 (1977).

[72] In United States v. General Elec. Co., 272 U.S. 476 (1926), the Court held that a patentee had unrestricted power to fix a licensee's prices, *id.* at 490, but a plurality of the Court later

With respect to refusals to license, some have suggested that once a patentee grants one license, all qualified applicants should be entitled to the same privilege.[73] Concededly, such a rule would prevent a patentee from bribing potential challengers. But because the rule would forbid a patentee from demanding a higher royalty from a second licensee than that obtained from the first, it tends to "burn the house to roast the pig."[74] It may be quite appropriate for the patentee to obtain a higher royalty from the second patentee owing, for example, to changes in demand and cost conditions since the first license was granted or to a desire to capture the benefits of one licensee's more efficient production methods.[75] The rule would prevent the patentee, moreover, from maintaining a proprietary position in industries in which buyers demand that the patented product be available from a second source as a condition of purchase from the patentee. Even if the rule were amended to permit the patentee to make reasonable changes in the terms of any subsequent licenses to adjust for changing conditions or preserve an acceptable proprietary position, the extraordinary costs of administrative determinations on the reasonableness of the economic terms and conditions would hardly justify the effort.

A rule can be formulated, however, that fairly protects the legitimate interests of the patentee and prevents the inhibition of challenges through licensing bribes, yet at the same time avoids costly administrative judgments on economic matters. Simply stated, the rule would impose an obligation on the patentee, once he has voluntarily granted *two* licenses, to issue additional licenses to all subsequent applicants on terms no less favorable than those granted to the less favored of the two initial licensees. This form of compulsory licensing, which may be aptly termed a "one license" rule because a patentee could grant one license without triggering the compulsory licensing requirement, would only minimally infringe on the

voted to overrule that holding in United States v. Line Material Co., 333 U.S. 287, 316 (1948) (Douglas, J., concurring, joined by Black, Murphy, and Rutledge, JJ.). The same day, the Court severely limited its *General Electric* holding. United States v. United States Gypsum Co., 333 U.S. 364, 389-91, 400-01 (1948). In 1965, the Court remained equally divided on whether to abandon *General Electric*. United States v. Huck Mfg. Co., 382 U.S. 197 (1965), *aff'g per curiam by an equally divided court* 227 F. Supp. 791 (E.D. Mich. 1964).

[73] *See, e.g.*, WHITE HOUSE TASK FORCE REPORT ON ANTITRUST POLICY [The Neal Report] V-2 to V-3, app. D at 3-4, 11-12 (1968); Turner, *Patent System*, *supra* note 13, at 474-76.

[74] I borrow the phrase from Justice Frankfurter's majority opinion in Butler v. Michigan, 352 U.S. 380, 383 (1957).

[75] *See* McGee, *supra* note 69, at 140.

patentee's rightful freedom to adjust to changing conditions. Although it would deny the patentee the right to demand from a third licensee a royalty rate higher than that charged one of his two predecessors, the likelihood that a third licensee would be willing to pay a higher rate in the absence of the rule is small simply because he would then have to compete with licensees who are paying a lower rate. Unless the patentee had an overwhelming share of the market, the value of the patent would, as a practical matter, be determined by the higher of the two royalty rates. If the patentee did have a very large share of the market, it is conceivable that he would want to grant only two licenses, that is create an oligopoly, with the aim of adjusting the price to make an appropriate monopoly profit on his own market share. Even though the selective refusal to license in this instance may not be designed to inhibit patent challenges, the patentee's issuance of the two licenses would trigger the proposed rule. But in these circumstances, the patentee with a substantial market share could achieve his legitimate goal by granting only one license. The principal effect of the proposed rule, then, would be to prevent a patentee from creating an oligopolistic market structure that is designed to diminish patent challenge incentives.[76]

Nor would the one license rule infringe on several important freedoms currently enjoyed by patentees. The rule would permit the creation of a second source, as required by many buyers of patented products, without destroying the patentee's proprietary position. And patent applicants would remain free to enter into interference settlements[77] in which the parties exchange proofs, the party having the earliest date taking the patent and the other obtaining a license thereunder without loss of proprietary position. The rule also avoids administrative valuation of patents—leaving it to the marketplace to control values[78]—while still discouraging monopolistic profit-sharing cartels under patent umbrellas and thereby counteracting stratagems designed to inhibit challenges.

[76] *See* pp. 991-93 *supra*.

[77] When an application is made for a patent which would interfere with a pending application, or an unexpired patent, the question of priority of invention is determined by a board of patent interferences. 35 U.S.C. § 135(a) (1970 & Supp. V 1975). The interested parties may terminate the interference by filing a settlement agreement with the Patent and Trademark Office. *Id.* § 135(c). *See generally* F. MACHLUP, *supra* note 3, at 8.

[78] Using Professor Calabresi's terminology, the one license rule is a "property rule" rather than a "liability rule." *See* Calabresi & Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1105-06 (1972).

A "one license" rule can also be formulated to deal effectively with the problems generated by price-fixing licenses. If the number of such licenses that can be issued were limited to one,[79] the rule would enable the manufacturing patentee to expand the market while retaining his price flexibility, that is, it would permit him to obtain a greater share of the monopoly profit.[80] The one licensee gains little from his price-fixing license because in the absence of the price-fixing provision, he would be free to follow the patentee's price policy anyway. Consequently, totally proscribing price-fixing clauses would serve no purpose in the context of manufacturing patentees. For the nonmanufacturing patentee, the rule would allow him to grant an exclusive license while retaining control of the price. But price fixing is clearly desirable in this situation: a royalty-bearing license that contains a price-fixing provision is better for society than one that does not, for it eliminates the restrictive effect on output of bilateral monopoly.[81]

B. Preventing Suppression of Use: Compulsory Licensing

As noted, the suppression of use problem arises whenever a patentee owns competing property the value of which would be reduced by exploitation of the patented invention.[82] In those circumstances, the patentee would decide either to forgo completely

[79] Some lower federal courts have held that a patentee may not fix the price at which a licensee sells unpatented products produced by a patented process. Cummer-Graham Co. v. Straight Side Basket Corp., 142 F.2d 646, 647 (5th Cir.), *cert. denied*, 323 U.S. 726 (1944); Barber-Colman Co. v. National Tool Co., 136 F.2d 339, 340, 344 (6th Cir. 1943). The Supreme Court left the issue open in United States v. Line Material Co., 333 U.S. 287, 301 n.14 (1948). When the patent covers a product rather than a process, however, the rule may be that the patentee may issue one, but only one, price-fixing license. *See* Newburgh Moire Co. v. Superior Moire Co., 237 F.2d 283, 292-94 (3d Cir. 1956); Tinnerman Prods., Inc. v. George K. Garrett Co., 185 F. Supp. 151, 158 (E.D. Pa. 1960), *aff'd*, 292 F.2d 137 (3d Cir.), *cert. denied*, 368 U.S. 833 (1961).

[80] *See* text accompanying notes 62-63 *supra*.

[81] When several firms hold licenses under a patent, their competition will prevent prices from significantly exceeding their cost plus the unit royalty charged by the patentee. The patentee will attempt to set the royalty so that this price is the profit maximizing price for the industry. If a single firm holds an exclusive license, however, it will seek to maximize its own profits by limiting production, thus raising the price above that which would maximize the patentee's profits. The patentee and the public will suffer because output will be reduced. A price-fixing provision will increase output by holding down the licensee's price. McGee, *supra* note 69, at 141-43. *See generally* Machlup & Taber, *Bilateral Monopoly, Successive Monopoly, and Vertical Integration*, 27 ECONOMICA 101, 103-13 (1960).

[82] *See* text accompanying notes 64-70 *supra*.

exploitation of the patented invention or to exploit it at a more leisurely pace than he otherwise would.

Any rule designed to eliminate leisurely exploitation would encounter serious obstacles. Enterprises of any substance are likely to own some property that could arguably be viewed as competing with a patent. An attempt to curb suppression would require a complex administrative structure capable of making ad hoc determinations both of the effects of such ownership on the patentee's decisions to exploit and of the optimum possible exploitation if ownership were in other hands. Because the benefits of such a structure could not justify its costs, no departure from the existing system, in which a patentee is free to choose his own level of exploitation, is advisable.

These obstacles are not present, however, if a patented invention is not exploited at all. Suppression of use may be fairly presumed if a patent is not exploited within a certain period of time. If an infringer uses an unexploited patent after this period has lapsed, the courts could reasonably deny the patentee injunctive relief against the infringer. Such a rule would, in effect, provide for compulsory licensing of nonused patents.[83] It would thus deprive a patentee of the right to select licensees of his choice, but if the time period were sufficiently long—for example, three years[84]—then only suppression or a failure to reach an agreement with an infringer could explain the patentee's failure to exploit or to license.[85]

[83] Congressional legislation has been proposed which would require compulsory licensing of any patent not commercially exploited within three years of the issuance of the patent. S. 814, 94th Cong., 1st Sess., § 1, 121 CONG. REC. 4059 (1975). The provision is similar to compulsory licensing rules in effect in other countries. Mirabito, *Compulsory Patent Licensing for the United States: A Current Proposal*, 57 J. PAT. OFF. SOC'Y 404, 421-30, 432-33 (1975); *see, e.g.*, Patents Act, 1949, 12, 13 & 14 Geo. 6, c. 87, § 37; Law No. 68-1 of Jan. 2, 1968, art. 32, [1968] J.O. 13 (Jan. 3, 1968), [1968] D.S.L. 68 (Fr.); Royal Decree No. 1127, June 29, 1939, art. 54, Gaz. Uff. No. 189 (Aug. 14, 1939), 50 Leg. Ital. 1476 (Italy). An alternative compulsory licensing statute is proposed and discussed in Arnold & Janicke, *supra* note 5, at 224-40.

[84] Such a rule would be consistent with the treaty obligations of the United States. The Paris Convention for the Protection of Industrial Property, to which the United States is a party, reads in part as follows:

> A compulsory license may not be applied for on the ground of failure to work or insufficient working before the expiration of a period of four years from the date of filing of the patent application or three years from the date of the grant of the patent, whichever period expires last . . . .

Paris Convention for the Protection of Industrial Property, art. 5(A)(4), *done* July 14, 1967, [1970] 21 U.S.T. 1583, T.I.A.S. No. 6923 (articles 1 through 12 of the Convention were entered into force by the United States in 1973, [1973] 24 U.S.T. 2140, T.I.A.S. No. 7727).

[85] The proposed rule would be triggered even when the failure to license resulted from bargaining failure. *See* note 25 *supra*. Thus, if the patentee chose not to exploit the invention,

This approach finds support in the Second Circuit's opinion in *Foster v. American Machine & Foundry Co.*[86] In *Foster*, the plaintiff, a distinguished patent attorney, owned, but had never exploited or licensed, a patent on a welding system that used electromagnets to control the path of the welding current in steel pipes and tubes.[87] The district court found against the defendant, the only user of the patented invention, but limited the patentee's relief to damages.[88] The court of appeals affirmed, justifying the denial of injunctive relief on the ground that if it were granted, the patentee could use the injunction to extract a larger award from the defendant than the court had seen fit to grant.[89] The court may have reasoned that the defendant's specialized resources, unique to using the welding system, would lose all value if the injunction were issued unless an agreement could be reached with the patentee, thus forcing the infringer to pay a sum considerably higher than a third party not already so committed would pay.[90]

Foster was essentially a bargaining failure case rather than one in which suppression was used to protect the value of competing property. This may explain the Second Circuit's failure to confront the Supreme Court's decision in *Continental Paper Bag Co. v. Eastern Paper Bag Co.*,[91] which expressly condoned suppression. In *Paper*

but sought only royalties, the rule would provide, in effect, for binding arbitration between the patentee and a potential licensee. In addition, while bargaining for a license, a prospective licensee often holds off making specialized preparations for fear that they would advance the patentee's bargaining position. *See* note 90 *infra*. Bargaining under the threat of compulsory licensing might reduce the effects of this market imperfection. *Cf.* Foster v. American Mach. & Foundry Co., 492 F.2d 1317, 1324 (2d Cir.), *cert. denied*, 419 U.S. 833 (1974), *discussed in* text accompanying notes 86-90 *infra* (denying equitable relief on ground that it would force bargaining under threatened loss of specialized resources).

[86] 492 F.2d 1317 (2d Cir.), *cert. denied*, 419 U.S. 833 (1974). *Foster* has elicited substantial comment in the literature, including that in a symposium on compulsory licensing. *A Discussion on the Compulsory Licensing of Patents in the United States*, 2 APLA Q.J. 144 (1974); *see* Arnold & Goldstein, *supra* note 5, at 128-31.

[87] 492 F.2d at 1319.

[88] *Id.* at 1318.

[89] *Id.* at 1324.

[90] Bargaining problems of this kind are not unique to patents. They appear in a variety of contexts: once assets are committed to any venture, they become hostage if they cannot be used without another's permission. When injunctions are involved, equity has responded by developing the equitable hardship doctrine. *See* Note, *Injunction Negotiations: An Economic, Moral, and Legal Analysis*, 27 STAN. L. REV. 1563, 1577-80 (1975).

[91] 210 U.S. 405 (1908). For a discussion of the continuing legal vitality of *Paper Bag* in the light of subsequent decisions, see Frost, *Legal Incidents of Non-use of Patented Inventions Reconsidered* (pts. 1 & 2), 14 GEO. WASH. L. REV. 273, 291-311, 435, 443-44, 456-59 (1946).

Bag, the infringer argued that nonuse of the patent undermined the policy of the patent statutes because it did not promote the progress of the useful arts.[92] The Court rejected the argument, reasoning that there was nothing unreasonable about nonuse "which had for its motive the saving of the expense that would have been involved by changing the equipment of a factory from one set of machines to another."[93] In effect, this reasoning suggests that the invention and use of a new and superior patent might be wasteful if the old machines were already doing the old job, a demonstrably faulty conception of the economics of suppression.[94] *Paper Bag*'s misguided notions of social value probably renders the case a legal anachronism and thus no serious barrier to *Foster*-like reasoning.

The compulsory licensing approach suggested here would also make the second-best technology available to competitors when a patent is not used because the patentee is exploiting a better competing invention. Competitors would, of course, make use of that technology only if the patentee was pricing the superior invention without regard for the existence of a competing invention. Knowledge of the consequences of suppression under the proposed rule, however, would induce the patentee to charge a lower price, thereby placing consumers in the same position they would occupy if the competing invention were held by another.[95]

At first glance, the proposed rule would appear unfair if applied to situations in which an invention is dominated by a basic patent that is solely exploited by the basic patentee. In these situations, the holder of the subordinate patent is not free to use it and hence would be required under the rule to license his invention to the basic patentee. By compelling cross-licensing, however, the proposed rule would

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[92] 210 U.S. at 422-23.

[93] *Id.* at 429. In response to the argument that the patented invention had been " 'deliberately held in non-use for [the] wrongful purpose' " of making more money from existing machinery, *id.* at 428 (quoting from the dissenting opinion in the court below, 150 F. 741, 744 (1st Cir. 1906)), the Court stated that

> it is certainly disputable that the non-use was unreasonable or that the rights of the public were involved. There was no question of a diminished supply or of increase of prices, and can it be said, as a matter of law, that a non-use was unreasonable which had for its motive the saving of the expense that would have been involved by changing the equipment of a factory from one set of machines to another? And even if the old machines could have been altered, the expense would have been considerable.

Id. at 429.

[94] *See* text accompanying notes 64-70 *supra*.

[95] *See* text accompanying notes 67-69 *supra*.

eliminate the conflict inherent in blocking patents.[96] Moreover, it would not significantly inhibit inventive activity because improvements in areas dominated by a controlling patent are rarely profitable under the existing system.[97]

V

The foregoing proposals are not designed to promote more stringent regulation of patents. Analysis of patents as property indicates that patent systems harbor the potential of substantial abuses through inhibition of challenges and suppression of use; the proposals are aimed at regulating private behavior so that a patentee can appropriate no more than the monopoly profit due him in light of the social value of his invention. That implementation of these rules is well within the equitable powers of the courts is evidenced by analogy to the thirty-year history of the patent misuse doctrine. Unfortunately, the doctrine itself cannot withstand an analysis of patents as property.

The patent misuse doctrine is a judicially created response to the latent capacity of patentees to tamper with the effective operation of the patent system to the detriment of society.[98] As a substantive

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[96] Firms occasionally set out to deliberately invent and patent improvements on competitors' technology in order to block their development. *See* F. MACHLUP, *supra* note 3, at 11-12; Frost, *supra* note 91, at 276-77. Perhaps the best known example of deliberate blocking is described in the infamous Memorandum on Policy of Hartford-Empire Company, Feb. 18, 1930, *reprinted in Investigation of Concentration of Economic Power: Hearings Before the Temporary National Economic Committee* (pt. 2), 75th Cong., 3d Sess. 771 (1938). The memo read in part:

> In taking out patents we have three main purposes—
> (a) To cover the actual machines which we are putting out, and prevent duplication of them. . . .
> (b) To block the development of machines which might be constructed by others for the same purpose as our machines, using alternative means. . . .
> (c) To secure patents on possible improvements of competing machines, so as to "fence in" those and prevent their reaching an improved stage.

Id. at 776. The proposed rule would serve to discourage this kind of activity and thus to help to eliminate one persistent objection to the operation of the patent system.

[97] Although inventing is usually a competitive activity, the invention of improvements to patented technology is not, because only the owner of the basic patent, or one who has the owner's permission, can use an improvement patent. Thus the owner of a basic patent can capture the social value of an improvement invention, but an outsider who invents an improvement must bargain with the owner of the basic patent before he can capture even a portion of his creation's social value. *See generally* Machlup & Taber, *supra* note 81, at 112-13. The owner of the basic patent, then, has a greater incentive to make an improvement invention than a nonowner.

[98] *See* General Tire & Rubber Co. v. Firestone Tire & Rubber Co., 349 F. Supp. 333, 341-45 (N.D. Ohio 1972), *aff'd in part, rev'd in part, and vacated in part*, 489 F.2d 1105 (6th Cir. 1973); L. SULLIVAN, *supra* note 71, at 521 n.2.

doctrine, patent misuse proscribes a patentee's attempt to extend his monopoly to unpatented components.[99] The paradigmatic misuse occurs when a patentee compels a licensee, typically through a tying arrangement incorporated into the license, to purchase an unpatented product from the patentee as a condition of use of the patented product. Procedurally, the doctrine permits a court to refuse to enjoin an infringer and to deny damages when a patentee has committed a substantive violation. The defects in the substantive underpinnings of the doctrine do not, of course, reflect on the power of the courts to effect such a remedy. But examination of the defects may elucidate the relationship between patent use and property rights.

A. The Substantive Doctrine: Property Rights and Price Discrimination

Commentators have argued that the practices proscribed by the patent misuse doctrine, rather than extending the patent monopoly, merely enable the patentee to capture the full monopoly value of the patent in a rational and inexpensive fashion.[100] Typically, these practices involve some form of price discrimination.[101] Price discrimination occurs whenever the seller of goods or services varies the price he charges to reflect the willingness of a buyer to pay.[102] Only monopolists can engage in price discrimination; in a competitive market, the price of a good or service reflects the seller's cost rather than the buyer's desire to obtain the product. Price discrimination permits

[99] The classic monopoly extension cases involved manufacturers who had tied the use of their patented products or processes to purchases of other unpatented products. *E.g.*, Leitch Mfg. Co. v. Barber Co., 302 U.S. 458, 460-61 (1938); Carbice Corp. of America v. American Dev. Corp., 283 U.S. 27, 30 (1931); Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. 502, 506 (1917). Relying on the doctrine of contributory infringement, the patentees sued the manufacturers of the competing tied product in an attempt to eliminate commerce in unpatented products used in conjunction with a patented product or process. *E.g.*, Leitch Mfg. Co. v. Barber Co., 302 U.S. at 459; Carbice Corp. of America v. American Dev. Corp., 283 U.S. at 28; Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. at 505. Relief was denied in each case; the patentees were not allowed to use their patents to gain control over the supply of unpatented material. *E.g.*, Leitch Mfg. Co. v. Barber Co., 302 U.S. at 462; Carbice Corp. of America v. American Dev. Corp., 283 U.S. at 33; Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. at 517.

[100] This argument is extensively developed in W. BOWMAN, *supra* note 8, at 64-119, and in Burstein, *supra* note 10.

[101] *See* W. BOWMAN, *supra* note 8, at 64-65; D. NEEDHAM, *supra* note 20, at 116, 120; Burstein, *supra* note 10, at 64-73.

[102] D. NEEDHAM, *supra* note 20, at 57; L. SULLIVAN, *supra* note 71, at 681.

monopolists to increase revenues and thus capture a larger share of the monopoly profits.[103]

Property rights systems that protect technologies against free-riding provide owners with a natural monopoly: because the cost of developing the technology is a sunk cost, the average cost per unit of the technology embodied in an invention necessarily declines as output increases.[104] Although price discrimination is not a consequence of the patent system's prohibition on reinvention and use—a trade secret owner could profitably engage in it as well—that prohibition does create unique problems in the patent system when a clearly valid patent is not threatened by a competing invention. Theoretically, a patentee in this privileged position would be able to engage in perfect price discrimination by charging each customer the maximum amount that particular customer would be willing to pay. In this theoretical world, the patentee would be able to capture the full social value of his invention during the patent's life while consumers would receive no share of that value until the patent expired.[105] That is not to say, however, that inventors would retain

[103] This is true so long as the cost of administering the price discrimination scheme does not exceed the increased revenues. *See* O. WILLIAMSON, MARKETS AND HIERARCHIES: ANALYSIS AND ANTITRUST IMPLICATIONS 11-13 (1975).

Professors Burstein and Baxter discuss practices which capture more of the monopoly profit without discriminatory pricing. Professor Burstein, for example, explains that even when price discrimination is not a useful technique, a monopolist may increase his return if he can prevent his customers from shifting away from the patented product in the face of higher monopoly prices. Such a shift is more likely to occur if the patented product is merely one input used in making another product. As the patentee raises his price to capture monopoly profits, the customers substitute other inputs for the patented product. Preventing this shift increases the return to the patentee, but can decrease the output of the final product. Burstein, *supra* note 10, at 78-83. Professor Baxter, focusing on final output, argues that in many cases even a royalty on the final product should be illegal. Baxter, *supra* note 57, at 306-12. *But see* W. BOWMAN, *supra* note 8, at 88-93. Like price discrimination, successful preclusion of input substitution enables a patentee to capture the monopoly profit inherent in the patent monopoly. Thus the arguments presented in this Article regarding price discrimination are equally applicable to preclusion of input substitution.

[104] Moreover, a technology is a public good; the marginal cost of additional use once it has been created is zero. Thus, when property rights in technology are recognized, a special type of natural monopoly is created: marginal cost, rather than declining as output increases (as is the case with an ordinary natural monopoly), is always fixed at zero. If two competing ordinary natural monopolies do not form a cartel, they will engage in ruinous competition until one is driven from the field, since the average variable cost of the larger firm must by definition be lower than that of the smaller firm. This will not occur when two technology monopolies compete, for the marginal costs of both are zero, and the larger firm will have no advantage. Thus two or more companies can develop and use a technology independently.

[105] In theory, price discrimination would also allow holders of process patents to increase revenues. *See* F. SCHERER, *supra* note 59, at 382-84.

this added wealth. Competition would inevitably draw additional resources into the activity of inventing until the increased profits resulting from perfect price discrimination were eliminated, that is, until the activity of inventing yielded only normal profits. In the context of physical capital goods used in competitive industries, investment in capital-creating activity yields a consumer surplus that is shared by consumers and investors alike. In the context of the capital-creating activity of inventing, however, investment coupled with perfect price discrimination could eliminate the consumer surplus without providing inventors with anything more than the ordinary rate of return. In such a situation, the argument could fairly be made that more than an optimum amount of inventive activity is taking place.[106] If one assumes that the cost of the additional resources drawn into the process of inventing would not appreciably increase the cost of those already committed to inventing,[107] a ban on perfect price discrimination would likely increase the surplus enjoyed by society from inventions. This reasoning suggests, then, that the prohibition of price discrimination would be appropriate.

But if one leaves the theoretical world and confronts the practicalities of the marketplace, the threat of perfect price discrimination becomes illusory. In the real world, price discrimination is achieved, if at all, by dividing customers into two or more classes according to their demand elasticities and then charging a different price to the members of each class. The consequence of such discrimination could be increased output over that of a simple monopoly. But even if output increased, the surplus going to consumers would most likely be less than under a simple monopoly.[108] Nevertheless, because of the

[106] This argument discounts the possibility that consumers will receive any surplus after the patent has expired. The omission is seemingly realistic because inventions are often obsolete long before the patent on them has expired. Even if the invention were to remain in use, the present value of a surplus that will not appear for 17 years is small at current interest rates. *See* G. STIGLER, THE ORGANIZATION OF INDUSTRY 123-25 (1968). The present generation of consumers, if asked, would probably want to enjoy some of the fruits of inventive activity immediately, rather than to leave them to the next generation.

[107] If the ability to invent is a scarce talent, then it is possible that increasing the returns of inventing will merely serve to increase payments to existing inventors without substantially increasing the number of inventions produced.

[108] The classic description of the various types of price discrimination available to a monopolist is J. ROBINSON, THE ECONOMICS OF IMPERFECT COMPETITION 179-202 (1933). Professor Robinson notes that for third-degree price discrimination to increase the monopolist's output, the demand curve in the more elastic market must be more concave than that in the less elastic market. *Id.* at 188-95. She believes that this is likely to be true. *Id.* at 201-02. But

imperfections in this form of price discrimination, consumers would continue to share in the wealth created by the patent. Thus, in these more typical conditions, because consumers benefit from the patented invention during the patent's life by their ability to purchase patented products or use patented processes at prices substantially lower than those available in the theoretical world, the argument for banning price discrimination is considerably weaker than it would be were perfect price discrimination a real possibility.

The argument is further weakened because the determination of whether particular practices involve price discrimination depends on how those practices are viewed. Consider, for example, the leading cases involving patented machinery sold subject to tie-in provisions that require the licensee to purchase from the patentee unpatented products used with the patented machinery.[109] Consumption of the tied products measures the intensity of use of the patented machinery.[110] Thus, the cost of the patented machinery varies with the length of time it is in use, though the charge per hour remains constant. From one perspective, price discrimination exists, because the price paid for the invention will vary among licensees depending on the number of hours each uses the invention. But if the use of the patented machine were treated as use of a patented process—a fair treatment given that the patent grants its owner an exclusive right to exclude others from using the patented machinery—then a charge based on use is not truly discriminatory because all users pay the same rate per unit of use. Accordingly, if viewed as a product, a patented capital good the sale price of which is keyed to intensity of use would be sold under a discriminatory pricing system, while if viewed as a process it would not. To brand this pricing practice discriminatory amounts to drawing an unreasonable and unnecessary dis-

social welfare is not necessarily increased merely because output is increased over that of simple monopoly. If the increased return were to stimulate the expenditure of additional resources, Posner, *supra* note 31, at 807-08, and consumer surplus were to decline, as it almost certainly would, welfare would be reduced. Moreover, this analysis overlooks the costs of administering the discriminatory pricing scheme, which would also reduce the gains in social welfare attendant upon increased output. *See* O. WILLIAMSON, *supra* note 103, at 11-13.

[109] *See, e.g.*, Morton Salt Co. v. G.S. Suppiger Co., 314 U.S. 488 (1942) (salt for salt dispensing machines); Henry v. A.B. Dick Co., 224 U.S. 1 (1912) (supplies for copying machines); Heaton-Peninsular Button-Fastener Co. v. Eureka Specialty Co., 77 F. 288 (6th Cir. 1896) (staples for shoe machines).

[110] The literature and arguments relating to tying as a counting device are reviewed at length in Burstein, *supra* note 10, at 64-73.

tinction between patented capital goods and process inventions.[111] To confuse matters further, the patents involved in the leading patent extension cases covered capital goods used in what were probably competitive industries and hence the firms purchasing the goods no doubt experienced similar demand elasticities. Measuring royalities by use, rather than indicating price discrimination, could merely reflect a shift in risk from the user to the patentee.[112]

An analysis of patents as property, then, suggests no strong case for imposing a wholesale ban on tying arrangements. Antitrust law, however, has developed restrictions on tie-ins to protect other sellers of the unpatented tied product from what is perceived to be an unfair practice by the manufacturer of the patented tying product.[113] These rules are based on precarious theoretical views of the market effects of vertical restrictions,[114] views which have recently been questioned by the Supreme Court.[115] But whatever the possible advantages or disadvantages of tying arrangements, they hardly justify the creation of so draconian a remedy as the doctrine of patent misuse.

B. Procedural Aspects of the Misuse Doctrine: Controlling Patent Abuses

The Supreme Court enunciated the doctrine of patent misuse in the 1942 case of *Morton Salt Co. v. G.S. Suppiger Co.*[116] In *Morton Salt*, the plaintiff owned the patent on a machine used in the canning industry for adding a predetermined amount of salt to certain canned goods.[117] The principal source of the plaintiff's profits, however, was in the sale of salt tablets used with the patented machines, which it leased to commercial canners under a license in which the licensees agreed to use only the patentee's salt tablets with the machine.[118] The defendant was also in the business of manufacturing and selling

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[111] *See generally* Baxter, *supra* note 57, at 280-99.

[112] *See* Burstein, *supra* note 10, at 69-73.

[113] L. SULLIVAN, *supra* note 71, at 431-71. *See* International Salt Co. v. United States, 332 U.S. 392, 395-96 (1947); International Business Machs. Corp. v. United States, 298 U.S. 131, 134-35 (1936).

[114] *See* W. BOWMAN, *supra* note 8, at 53-119. *See generally* Burstein, *supra* note 10.

[115] Continental T.V., Inc. v. GTE Sylvania Inc., 97 S. Ct. 2549, 2556-63 (1977). *See also* Robinson, *Recent Antitrust Developments: 1974*, 75 COLUM. L. REV. 243, 243-60 (1975).

[116] 314 U.S. 488 (1942).

[117] *Id.* at 489.

[118] *Id.* at 491.

salt tablets to canneries.[119] The basis for the litigation was the defendant's manufacture and leasing of an unpatented and allegedly infringing salt depositing machine.[120] The trial court granted summary judgment for the defendant on the ground that the patentee was using the patent to restrain trade in the sale of salt tablets.[121] The court of appeals reversed, reasoning that no violation of the antitrust laws had been established.[122]

On certiorari, Chief Justice Stone's opinion for a unanimous Court declared that the central question was whether "a court of equity will lend its aid to protect the patent monopoly when [it is being used] as the effective means of restraining competition with its sale of an unpatented article."[123] The Court asserted that "a patent affords no immunity for a monopoly not within the [statutory] grant"[124] and reasoned that the successful prosecution of an infringement suit—even against one not competing with the sale of the unpatented product—would thwart the public policy underlying the grant of the patent.[125] Of particular relevance to the implementation of the rules proposed in this Article, Chief Justice Stone stated that equity courts "may appropriately withhold their aid where the plaintiff is using the [patent] right asserted contrary to the public interest."[126] Accordingly, the Court denied both damages and injunctive relief.

The effect of the *Morton Salt* doctrine is to permit an infringer to collect a reward from the patentee for bringing the latter's alleged misuse to a court's attention, a reward equal to the damages the infringer would otherwise owe the patentee. The infringer thus becomes a private attorney general able to collect a fine that bears no relationship to the damages suffered by society as a consequence of the patentee's supposed wrongdoing.[127] Indeed, in its current application, the doctrine permits infringers to ferret out any antitrust violation tangentially related to the infringed patent, whether or not a monopoly extension practice is involved. Thus, in *Ansul Co. v. Uni-*

[119] *Id.*
[120] *Id.* at 490-91.
[121] *Id.* at 489-90.
[122] *Id.*
[123] *Id.* at 490.
[124] *Id.* at 491.
[125] *Id.* at 493.
[126] *Id.* at 492.
[127] No one need be harmed before the misuse doctrine comes into play. *See* Berlenbach v. Anderson & Thompson Ski Co., 329 F.2d 782, 784 (9th Cir.), *cert. denied*, 379 U.S. 830 (1964).

royal, Inc.,[128] the defendant, who had employed an arguably lawful resale price maintenance system for its patented product, in effect paid an enormous fine to a willful infringer when, following an extended trial, the maintenance scheme was held unlawful.[129] Astonishingly, the plaintiff had suffered no injury from the defendant's pricing arrangement.[130]

The continuing application of the misuse doctrine represents a deliberate refusal to consider the utility of antitrust remedies to regulate monopoly extension practices, remedies which can scarcely be deemed inadequate.[131] More seriously, the doctrine's manifest intolerance of the patent system itself is a result of the courts' failure to analyze the nature of the patent right. Given the practical relationship between price discrimination and the ability of patentees to obtain a rightful portion of the social value of their inventions, the blanket prohibition of certain pricing practices is clearly inconsistent with the character of patents as property. The doctrine sharply overreaches, moreover, by prescribing remedies that are unrelated to the injury involved. Practices truly injurious to the public good can be regulated by the antitrust laws; certainly nothing in the nature of patents as property justifies the creation of rules based on antitrust principles to regulate conduct controlled by the antitrust laws themselves.

For interesting discussions of private enforcement of law, see Becker & Stigler, *Law Enforcement, Malfeasance, and Compensation of Enforcers*, 3 J. LEG. STUD. 1 (1974), and Landes & Posner, *The Private Enforcement of Law*, 4 J. LEG. STUD. 1 (1975).

Because of the severe penalty imposed under the misuse doctrine, patentees must opt for the most conservative interpretation when substantive misuse law or antitrust doctrine is unclear, even though it may reduce the patentee's reward. In addition, the patentee must carefully police its own employees, often a costly process. All these costs must be incurred even though the acts that are prevented would not often harm consumers.

Moreover, the scope of the misuse remedy creates a strong incentive for a defendant to assert a misuse defense, no matter how farfetched. *See* Breit & Elzinga, *Antitrust Enforcement and Economic Efficiency: The Uneasy Case for Treble Damages*, 17 J. LAW & ECON. 329, 340-44 (1974).

[128] 306 F. Supp. 541 (S.D.N.Y. 1969), *aff'd in part and rev'd in part*, 448 F.2d 872 (2d Cir. 1971), *cert. denied*, 404 U.S. 1018 (1972).

[129] *Id.* at 558.

[130] *Id.* at 564-65.

[131] The antitrust laws now provide extensive criminal penalties for violations of the Sherman Act, 15 U.S.C. §§ 1-7 (1970 & Supp. V 1975), as well as treble damages to successful private plaintiffs, *id.* § 15 (1970). The latter provision prescribes the fine that can be collected by a private attorney general—twice the actual damages suffered. One who is not injured, however, has no standing to sue under § 15. The Supreme Court has recently held that if a patent is related to an antitrust violation, the government may challenge its validity. Even if it is found valid, the court may require that it be licensed. United States v. Glaxo Group Ltd., 410 U.S. 52, 64 (1973).

In short, if the equity courts are to withhold their aid at all, they should only do so when the purpose of that denial is to prevent private tampering with the patent system aimed at capturing more than the appropriate share of an invention's social value. The equitable doctrine of patent misuse as now applied by the courts, though it provides the procedural basis for effecting a property rights vision of the patent system, is, substantively, a rule in search of a justifying economic rationale. In contrast, the rules suggested herein, which could easily be implemented by resort to the same equitable powers of the courts, would ensure that the patentee obtains that portion of the social value of his invention—and only that portion—which is inherent in the superiority of the invention over its competitors, a value consistent with the character of patents as property.