

INTELLECTUAL PROPERTY

The Law and Economics of Patent Infringement Damages

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Traditionally, economists have played a surprisingly limited role in the damage phase of patent infringement cases. Until recently, patent infringement damages have been the exclusive domain of accountants and patent lawyers. This is unfortunate because economic theory can be a powerful tool for both calculating your client's damages or challenging the logic of your opponent's damage calculation.¹ The purpose of this article is to familiarize Utah Bar members with how economists approach the murky law of patent damages.

THE PATENT STATUTE

The starting point for any analysis of patent damages is 35 U.S.C. §284 (the "Patent Statute"), which provides that:

Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty, for use made of the invention by the infringer.

(Emphasis added.)

Prior to 1946, the precursor to section 284 went beyond "compensation", allowing for both recovery of compensation and the infringer's profits. The 1946 Amendment, Act of August 1, 1946, Ch. 726, § 1, eliminated the language regarding the infringer's profits and added the reference to compensation.²

This revision is important. Before 1946, patent owners were awarded damages that included both the lost profits to the patent owner and the infringer's profits.³ Essentially, a successful plaintiff was placed in a better position than had the infringement not occurred because profits on some sales were counted twice--once as lost profits to the patent owner and again as the actual profits the infringer received. The Supreme Court interpreted the 1946 revision as correcting this situation. *Aro Manufacturing Co. v. Convertible Top Replacement Co.*, 377 U.S. 476 (1964), held that the intent of the revised statute was to limit a plaintiff's damages to "compensation for the pecuniary loss [the patent owner] has suffered from the infringement, without regard to the question whether the defendant has gained or lost by his unlawful acts." *Id.* at 507. According to the Court, the statutory reference to compensatory damages means that damages are limited to "the difference between [the patent owner's] pecuniary condition after the infringement, and what his condition would have been if the infringement had not occurred." *Id.* In other words, "[h]ad the infringer not infringed, what would [the] Patent Holder ... have made?" *Id.*

LOST PROFITS

The Patent Statute is also abundantly clear as to how compensation is to be calculated. Compensatory damages have consistently been interpreted by the United States Court of Appeals for the Federal Circuit (the "Federal Circuit")⁴ to mean "lost profits," with a reasonable royalty acting as the floor for damages when lost profits cannot be proven. Accordingly, plaintiffs will typically seek lost profits when possible, and attempt to calculate a reasonable royalty only when insufficient information is available to prove lost profits, or when the requirements of such proof cannot be satisfied.

Proof of lost profits requires that the patent owner demonstrate that, absent infringement, he would have made the sales that the infringer actually made. The standards for such proof have changed measurably in the last fifteen years. Before the establishment of the Federal Circuit, the burden of proof to establish lost profits was substantial. Any possibility that someone other than the patent owner could have made any sales of the infringer completely negated a recovery of lost profits. *See Tektronix, Inc. v. United States*, 552 F.2d 343, 349 (Ct. Cl. 1977) ("if lost profits are ever to be awarded ... it should be only after the strictest proof that the patentee would actually have earned and retained those sums in its sales"). In contrast, the Federal Circuit has adopted a lower standard of "reasonable probability." Under that standard, the patent owner must show only that it is more probable than not that he would have made the infringer's sales.

While the Federal Circuit has made it clear that there is no single method by which the patent owner must carry its burden of proving lost profits, by far the most common approach is the four-part test outlined in *Panduit Corp. v. Stahlin Brothers Fibre Works, Inc.*, 575 F.2d 1152 (6th Cir. 1978). The Panduit test requires that the plaintiff establish (1) the existence of demand for the patented product, (2) the absence of acceptable noninfringing substitutes, (3) the patent owner's ability to meet demand, and (4) some proof of the amount of profit lost per lost sale. *Id.* at 1156. Satisfying these four factors results in the establishment of the fact that, absent infringement, the patent owner would have made the infringer's sales.

The first prong of the *Panduit* test is rarely difficult for the plaintiff to meet. In fact, it is nonsensical. After all, if there were no demand for the patented product, there would be no infringement either. Likewise, the fourth factor may require little more than the production of the plaintiff's income statement. It is not surprising, then, that the key inquiries involved in proving lost profits are the absence of acceptable noninfringing substitutes, and the patent owner's ability to produce, market and sell to the infringer's customers. Both of these questions are well-suited for economic analysis, and the Federal Circuit has increasingly incorporated economic analysis when addressing these issues.

Initially, the Federal Circuit required proof that noninfringing substitutes did not possess all of the attributes of the patented product. *See e.g., TWM Manufacturing Co., Inc. v. Dura Corp.*, 789 F.2d 895, 901 (Fed Cir. 1986) ("a product lacking the advantages of the patented [product] can hardly be termed a substitute acceptable to the consumer who wants those advantages"). Such a test cannot withstand even cursory scrutiny, however, because substitutes that possess literally all of the attributes of the patented product would be infringing, not "noninfringing." Accordingly, the effect of this early Federal Circuit doctrine was to assure that patent owners virtually automatically met the critical second prong of the *Panduit* test.

The logical defect in this first approach led the Federal Circuit to focus on the attitudes of consumers toward the patented product and any substitutes, rather than on their physical attributes. While this change of focus marked an improvement, the Federal Circuit also held that acceptable noninfringing substitutes are legally absent when some set of customers can be shown to prefer the patented product. *See Standard Havens Products, Inc. v. Gencor Industries, Inc.*, 953 F.2d 1360, 1373 (Fed. Cir. 1991) ("if purchasers are motivated to purchase because of particular features available only from the patented product, products without such features - even if otherwise competing in the market place - would not be acceptable noninfringing substitutes"). The difficulty with this approach is that, if consumer tastes are not uniform, some subset of consumers will always prefer the patented product. As a consequence, this second approach also negated any serious analysis and assured that the patent owner could satisfy the second *Panduit* prong.

Federal Circuit case law has now advanced significantly. In *State Industries, Inc. v. Mor-Flo Industries, Inc.*, 883 F.2d 1573 (Fed. Cir. 1989), the Federal Circuit held that lost profits are available to the patent

owner only for the share of the infringing sales that would have gone to the patent owner absent the infringement. The Federal Circuit has thus finally dispensed with the rigid all or nothing approach of Panduit. Under this new procedure, a court can award lost profits to the patent owner on the portion of the infringer's sales that are equal to the patent owner's market share. This approach, though a substantial improvement, is still not without its problems, however. The Mor-Flo approach is economically correct only for cases in which the products at issue are "homogenous", that is, where the products lack significant brand name recognition or significant physical or quality differences. However, in cases where products are heterogenous, the Mor-Flo market share approach may still lead to erroneous conclusions.

Consider the following example of infringement in the carbonated soda industry where products are heterogenous. Suppose it were found that Pepsi had been infringing on the patented formula used by Coca-Cola (in reality the formula is a trade secret). Assume further that the relevant market is defined as branded soda in the United States and includes the sales of 7-Up, Dr. Pepper, several root beer brands and a few other products sold nationally.⁵ Moreover, for purposes of illustration, assume that in this market, Coca-Cola's market share is 30% and Pepsi's is 20%. Using the Federal Circuit's current analysis, Coca-Cola would be entitled to lost profits on 30% of Pepsi's sales. The lost profits calculation would take Coca-Cola's profit margin and multiply it by 30% of Pepsi's sales.⁶ The theory is that if Pepsi had not infringed its customers would have switched to other branded soda products in proportion to their market shares. But this assumption is clearly erroneous. If Pepsi had not infringed, Coca-Cola would have more likely garnered more than 30% of the Pepsi sales. This is because Coke and Pepsi are very close substitutes while the other branded sodas are more distant substitutes. Consumers who purchased Pepsi are likely to have preferred another cola product like Coca-Cola to products like 7-Up, Dr. Pepper or root beer. The problem being illustrated is that the market share approach treats all competing products in the market as equals, even when clearly this is not the case.

In *BIC Leisure Products, Inc. v. Windsurfing Intern, Inc.*, 1 F.3d 1214, 1218 (Fed. Cir. 1993), the Federal Circuit recognized the importance of product differentiation to the lost profits analysis. In that case, the patent owner sold a high-end, high-priced wind surfing board, while the alleged infringer sold a similar but lower priced, low-end board. The Federal Circuit reached beyond the standard market share approach to lost profits and held that the two products at issue, while arguably part of the same product market, were sufficiently differentiated that the patent owner would probably have sold to very few of the infringer's customers. This was the court's conclusion despite the fact that the patent owner had a significant overall market share. BIC Leisure thus represents a clear advance in economic thinking for the Federal Circuit.

In order to be entitled to lost profits damages, the patent owner must also demonstrate that he possesses the marketing and manufacturing capability to make the infringer's sales. The reason is that, even if it can be shown that demand would have gone to the patent owner absent the infringement, the patent owner must still show that it could have met the additional demand.⁷ While in the past the ability to make the infringer's sales was considered solely from the point of view of manufacturing capacity, courts today inquire whether the patent owner has the ability to market and service the infringer's customers as well. See *Polaroid Corp. v. Eastman Kodak Co.*, 16 U.S.P.Q. 2d 1481 (D. Mass. 1990). This is important because, as any businessman knows, the ability to procure sales requires much more than merely producing the product. The ability to distribute, market and service a product is equally as important as the manufacturing capacity to produce it. In sum, the Federal Circuit's analysis of the Panduit factors has evidenced a willingness and increasing ability to apply economic analysis in the calculation of the patent owner's lost sales.

PRICE EROSION

Lost profits include not only the loss of sales due to infringement but also the price reduction that results from the unlawful competition from the infringer. This reduction in price, or "price erosion," is now a recognized part of the lost profits damage measure. According to the Federal Circuit, "lost profits may be in the form of diverted sales, eroded prices, or increased expenses. The patent owner must establish a causation between his lost profits and the infringement. A factual basis for the causation is that 'but for' the infringement, the patent owner would have made the sales that the infringer made, charged higher prices, or incurred lower expenses." *See LAM, Inc. v. Johns-Manville Corp.*, 718 F.2d 1056, 1065 (Fed. Cir. 1983) (emphasis added).⁸

The earliest case to establish a price erosion element of lost profits was *Yale Lock Manufacturing Co. v. Sargent*, 117 U.S. 536, 548 (1886). In *Yale Lock*, the Supreme Court found that the infringer was selling locks that included the infringing device at a lower price than the patent owner. As a result, the patent owner was forced to lower his price by \$1 on some types of locks and \$2 on other types of locks. The Court awarded, as part of the patent owner's lost profits, the erosion of the patent owner's lock price multiplied by the sales on which the lower price had been applied. But *Yale Lock* failed to consider the impact that the hypothetical price increase might have on output or sales. As some later courts have recognized, it is not consistent for the patent owner to claim that "but for" the infringement prices would have been higher, while at the same time contend that total sales would have remained unchanged.⁹

Economic principles teach that there is a direct relationship between the price level and the level of output or sales.¹⁰ Some courts have recognized this connection. For example, in the seminal case of *Panduit Corp. v. Stahl Bros. Fibre Works*, 575 F.2d 1152, 1157 (6th Cir. 1978), Judge Markey held for the purposes of calculating lost profits that demand was sufficiently elastic that "any loss in Panduit's profits due to the price reduction was more than compensated by the gain in profits due to the increase in plaintiff's sales volume because of the price reduction." *Id.* at 1157. Similarly, in *Polaroid Corp. v. Eastman Kodak Co.*, 16 U.S.P.Q. 2d 1481 (D. Mass. 1990), the Massachusetts District Court concluded that no lost profits from price erosion were justified because "the higher prices Polaroid says it would have charged would have depressed demand so substantially that the strategy they historically pursued is actually the more profitable one." *Id.* at 1506. Put differently, the court found that price elasticity was already too high to justify an award based on price erosion.

Despite the apparent simplicity of this principle, the majority of courts that have awarded damages for price erosion have done so without adjusting the level of output on which lost profits are calculated. The case of *Micro Motion, Inc. v. Exac Corp.*, 761 F. Supp. 1420 (N.D. Cal. 1991), is illustrative. The case involved Exac's infringement of Micro Motion's patent for flow meters. Before Exac entered the market, Micro Motion was the only supplier of the flow meters at issue. Micro Motion claimed patent damages in the form of lost profits on Exac's sales for which Micro Motion had the capacity to produce, and a reasonable royalty on the remainder of Exac's sales. But Micro Motion also claimed that, but for the infringement, its prices on its sales would have been higher. It called Professor Daniel Rubinfeld, a nationally recognized economist, who testified that absent infringement Micro Motion's prices would have been 4% higher, and as a result total output would have been 1% lower (thus, elasticity was .25). Citing to this testimony, the court awarded the plaintiff an additional 4% of sales on the lost profits portion of Exac's sales, but surprisingly did not reduce the size of the total output base consistent with Professor Rubinfeld's analysis. The court was clearly in error. Either output should have been reduced based on the theorized price increase as plaintiffs' expert conceded, or the court should have refused to grant damages for price erosion all together on the theory that, if Micro Motion would have licensed Exac (the basis for the reasonable royalty award), Exac would have competed with Micro Motion for all sales (since it had a license), eliminating any ability of Micro Motion to raise price.

THE ENTIRE MARKET RULE

Another issue often raised in patent infringement cases is what product sales are eligible for compensation to the patent owner -- that is, can the sale of products not covered by the patent in suit be a basis for lost profits? The contours of the proper legal and economic limitations to recovery on the sales of non-patented items raises serious legal and constitutional issues. Only a brief outline of the pertinent rules is provided here.¹¹ The Federal Circuit recently addressed this issue in *Rite-Hite Corp. v. Kelley Co., Inc.*, 56 F.3d 1538, 35 U.S.P.Q. 2d 1065, 1071 (Fed. Cir. 1995). There, the Federal Circuit held that lost profits on non-patented components or complementary products sold with the patented product must satisfy the so-called "entire market rule" to be compensable. The entire market rule requires that, in order to be recoverable, the "unpatented components must function together with the patented components in some manner so as to produce a desired end product or result. All the components together must be analogous to components of a single assembly or be parts of a complete machine, or they must constitute a functional unit." *Id.* at 1071. Thus, the sale of products that are complementary to a patented product (i.e., convoyed sales) but not functionally integrated, are not compensable.¹² The court reasoned that the Patent Statute sought to compensate only competitive injury, and products sold with the patented product do not necessarily compete directly with the infringer.

While this reasoning narrows the lost profits recovery by eliminating awards for convoyed sales, it expands potential recoveries for lost sales on products not covered by the patent in suit, but which nonetheless compete with the infringer's products. To illustrate such a situation, suppose that the patent owner sells two products, A & B. Assume further that the infringer infringes the patent covering product A, but sells its product in competition with product B. According to *Rite-Hite*, the patent owner can recover for lost profits on its lost sales of product B, even though product B does not use the patented technology.

The *Rite-Hite* holding is likely to raise future controversy.¹³ The foundation of the *Rite-Hite* rule lies in the court's definitions of "competition" and "functional integration". Both concepts are defined narrowly by the Federal Circuit. Functional integration is defined in physical rather than economic terms, focusing on how products physically relate to each other in use, rather than the efficiencies or inefficiencies from complementarity. Likewise, competition is limited to a direct product by product confrontation and does not consider broader strategic rivalry among firms. Economic analysis can be useful in unpacking the logic of the *Rite-Hite* holding as these issues are revisited in the future.

REASONABLE ROYALTY

One of the most confusing areas of patent damage law is the calculation of a reasonable royalty. In my view, application of three economic principles is critical to maintaining even minimal consistency in calculating a reasonable royalty. The three bedrock economic principles are: (i) there must be gains from voluntary trade; (ii) measures of cost must include "opportunity cost"; and (iii) distribution of the gains from trade are indeterminate.¹⁴ As discussed below, strict adherence to these three basic economic principles is necessary to arrive at any defensible reasonable royalty calculation.

Absent an "established royalty,"¹⁵ the Federal Circuit requires that a reasonable royalty be determined as the "hypothetical results of hypothetical negotiations between the patentee and the infringer (both hypothetically willing) at the time infringement began." *Mahurkar v. C. R. Bard, Inc.*, 79 F.3d 1572, 1579 (Fed. Cir. 1996). In other words, the Federal Circuit test asks what royalty would have resulted from a voluntary negotiation between the patent owner and the infringer prior to the onset of the infringement. This test is called the willing licensor/willing licensee test.¹⁶

In applying the willing licensor/willing licensee test, it must be assumed that there are mutual gains from

