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## **NON-OBVIOUSNESS**

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Under United States patent law, a patent shall not be issued if “the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.”<sup>1</sup> Contemporary patent law has weakened this non-obviousness requirement, leading to the grant of many patents on trivial inventions. This proliferation of patents is almost certainly economically wasteful.

This article examines the non-obviousness standard, and explores the possibility of raising it thus to reward significant inventions while avoiding a proliferation of economically undesirable patents. Part I, it shows the actual workings of the standard, as that standard is applied by the Court of Appeals for the Federal Circuit (CAFC) and the Patent and Trademark Office (PTO). This Part includes examples that show the weakness of the standard. Part II reviews the historical and constitutional sources of the standard, and shows that a higher standard may constitutionally required. Part III shows that a higher standard is economically desirable, and suggests a specific new standard. Part IV demonstrates the workability of such a standard by showing how it could be applied in practice.

### 1 THE ISSUE

#### 1 The concept of non-obviousness

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<sup>1</sup> 35 U.S.C. § 103.

“Non-obviousness,” or, as known in Europe, “inventive step”<sup>2</sup> is one of four traditional (and widely accepted) requirements for the grant of a patent. The other three are “novelty,” i.e. that the invention be new,<sup>3</sup> that it be useful,<sup>4</sup> i.e. have “utility” or “industrial applicability,”<sup>5</sup> and that it be “enabled,”<sup>6</sup> i.e. adequately described in the proposed patent. The novelty and non-obviousness principles are designed to work together to ensure that the patent monopoly is available only for genuinely new inventions. The novelty standard asks whether the invention has been previously described or practiced, and actually looks at previous references and practices; it thus determines whether the invention is within the existing state of the art. The non-obviousness principle then asks whether the invention is an adequate distance beyond or above that state of the art; it clearly and unavoidably, therefore, involves a judgment call.

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<sup>2</sup> “An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art.” European Patent Convention [hereinafter EPC], Article 56, sentence 1.

<sup>3</sup> 35 U.S.C. § 101.

<sup>4</sup> Id.

<sup>5</sup> EPC Art. 52 speaks of “susceptible of industrial application.”

<sup>6</sup> 35 U.S.C. § 112.

There was no statutory non-obviousness requirement in U.S. statutory patent law until the Patent Act of 1952.<sup>7</sup> There was, however, a court-made non-obviousness standard, long discussed, but most clearly stated in 1851 in *Hotchkiss v. Greenwood*.<sup>8</sup> During the mid-20th century, this requirement was placed on constitutional grounds — without it, the patent system would not, as viewed by the Supreme Courts, contribute to “the progress of . . . useful Arts.”<sup>9</sup> The Supreme Court also imposed a “flash of creative genius” requirement during this period.<sup>10</sup>

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<sup>7</sup> Pub. L. 82-593 (July 19, 1952).

<sup>8</sup> “Unless more ingenuity and skill . . . were required . . . than were possessed by an ordinary mechanic acquainted with the business, there was an absence of that degree of skill and ingenuity which constitute essential elements of every invention. In other words, the improvement is the work of the skilful [sic] mechanic, not that of the inventor.” 11 How. 248, 267.

<sup>9</sup> U.S. Constitution, Art. 1, § 8, cl.8.

<sup>10</sup> *Cuno Corp. v. Automatic Devices Corp.*, 314 U.S. 84, 91 (1941).

As viewed by patent law reformers in the late 1940s, the “flash of creative genius” was too severe. One of the purposes of the 1952 Patent Act, quoted above, was to restate the older court-made requirement. The Supreme Court interpreted the nonobviousness provision of the new act in 1966 in the leading case of *Graham v. John Deere Co. of Kansas City*.<sup>11</sup> The Court strongly restated the idea that the non-obviousness doctrine rests on constitutional grounds, and also rejected the idea that the 1952 statute changed the legal standard, except to eliminate the flash of genius requirement. It thus noted that “the inquiry which the Patent Office and the courts must make as to patentability must be beamed with greater intensity on the requirements” of the statute, but went on “we find no change in the general strictness with which the overall test is to be maintained.”<sup>12</sup>

The standard has been elaborated and greatly weakened in a very specific and relatively detailed body of patent law, developed primarily by the CAFC, and its predecessor, the Court of Customs and Patent Appeals (CCPA).<sup>13</sup> It is principles of that body of law which will be the focus of this article. The non-obviousness doctrines, as actually applied, take into account three types of analytic approaches:<sup>14</sup>

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<sup>11</sup> 383 U.S. 1 (1966).

<sup>12</sup> 383 U.S. at 30.

<sup>13</sup> Since 1982, the CAFC has held exclusive appellate jurisdiction in patent law issues (save, of course, for the Supreme Court). The change was made in Pub. L. 96-416 (1980). The CCPA had jurisdiction over appeals from the Patent and Trademark Office (PTO), but shared jurisdiction with the circuit courts over appeals from district court infringement decisions.

<sup>14</sup> This is my listing, based on the actual practice of the CAFC (which are reflected in the second approach) and on the approaches identified in *Graham*, which discussed both the logic of working from the capabilities of the person of ordinary skill and the role of the secondary factors (and are reflected in the first and third approaches):

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failures of others, etc. might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

First, direct efforts to define the capabilities of a “person having ordinary skill in the art,” and application of that definition to specific contexts.

Second, precepts applied as rules of law defining those capabilities in specific contexts.<sup>15</sup> These precepts are compiled in the Patent and Trademark Office’s (PTO) Manual of Patent Examining Procedure (MPEP)<sup>16</sup> and are normally followed by examiners. There is an analogous document available for the European Patent Convention (EPC), based on

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<sup>15</sup> The term “precepts” is mine; it is not a formal term of art.

<sup>16</sup> Revised February 2000. Available online at <http://uspto.gov/web/offices/pac/mpep/index.html>.

the Case Law of the Boards of Appeal;<sup>17</sup> many but not all of the doctrines are similar to those of the MPEP.

Third, consideration of “secondary” empirical factors, such as whether the invention satisfied a “long-felt need” or was successful in the marketplace.

This article will concentrate on the second group of principles, which are often crucial in determining patentability at the PTO. They are often much weaker than the principles defined by the Supreme Court as in *Graham*.

## 2 Application of the standard

Scientists or engineers looking at a sample of issued patents will often say that the patented inventions were obvious to them. As a person with both scientific and legal background, I find that the level of inventive step needed to create a patented invention is less than that involved in solving many of the problems at the end of chapters in scientific or engineering casebooks. And the judgment of my technical friends is certainly that the legal standard of non-obviousness is significantly lower than the scientific or engineering conception of non-obviousness. In part, this lower legal standard is a result of the patent lawyer’s interpretation of the standard. Indeed, the Canadian version interprets the reference person as being one who is

skilled in the art but having no scintilla of inventiveness or imagination; a paragon of deduction and dexterity, wholly devoid of intuition; a triumph of the left hemisphere over the right.<sup>18</sup>

However the standard is also a result of the precepts as can be seen by an example.

## 3 The doctrines at work: Thermal insulating sleeves for beverage cups

In a breakfast conversation, I jokingly said that the standards of patent law non-obviousness were so low that even the cardboard ring to help me hold my coffee cup without burning my hand might be patentable. Then one of my breakfast partners noted the patent number on the ring.

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<sup>17</sup> Available at [http://www.european-patent-office.org/case\\_law/english/](http://www.european-patent-office.org/case_law/english/).

<sup>18</sup> *Beloit Canada Ltd. v. Valmet OY*, 8 C.P.R. (3d) 289 at 294 (1986).

It turns out that there is a patent subclass 220/739, indented under subclass 220/737. Class 220 as a whole covers “Receptacles.” Subclass 220/737 covers “Container holder[s],” and is annotated: “Subject matter including structure intended to receive and support a receptacle,” with a note “These attachments normally remain with the receptacle during use. The receptacle is normally discarded after use and the holder reused.”<sup>19</sup> The indented, i.e. subclass ,737 is described as “Insulated,” and is annotated: “Subject matter wherein at least a portion of the receptacle holder is made of a low heat conducting material.” As of August 3, 2001, there had been 144 patents issued in the subclass 220/739.<sup>20</sup>

Not all the patents in this category are actually coffee cup holders, nor are all coffee cup holders given this category, but there are enough patents in the area to demonstrate the working standard of non-obviousness, and to show how the precepts are used. The specific examples discussed here are selected entirely unscientifically.

The need for such coffee cup rings and the state of the art were spelled out in U.S. Patent 5,667,135 issued to Schaefer in 1997:<sup>21</sup>

Hot beverages . . . can present a handling problem to the consumer when dispensed into paperboard drink cups. . .

In order to minimize such discomfort for customers, many retailers of hot beverages have resorted to using at least a pair of nested drink cups . . . so that the outer drink cup provides some degree of thermal insulation for the hot beverage contained by the inner drink cup. Such a precautionary technique, however, results in increased cup costs for the beverage retailer.

Other alternatives have also been proposed, such as cup sleeves disclosed in U.S. Pat. Nos. 3,908,523 to Shikaya, 5,205,473 to Coffin, Sr., and 5,222,656 to Carlson. The Shikaya ‘523 and Coffin, Sr. ‘483 patents each suggest providing thermal insulating sleeves for beverage cups having generally longitudinally oriented corrugations. The Carlson ‘656 patent suggests forming a tubular insulating sleeve from a felt-like material

Recently, a paperboard sleeve has been offered for sale by Java Jacket of Portland, Oreg. The Java Jacket paperboard sleeve is an arcuate section of relatively heavy weight

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<sup>19</sup> The entire subclass 220/737 is itself indented under subclass 220/694, which covers “container attachment[s] or adjunct[s].”

<sup>20</sup> This number is based on a search of patents on the PTO’s web site, [www.uspto.gov](http://www.uspto.gov), using “220/739” as the search term and “primary classification” as the search field.

<sup>21</sup> Thermal insulating sleeve for drink cups, Sept. 16, 1997.

paperboard whose surfaces have been impressed with rows of off-set dimples between which is formed a series of raised reliefs. Opposed slits at each end of the arcuate section allow the ends to be interlocked so that the sleeve may be held in position around the exterior of a paperboard container.

The 1975 Shikaya patent disclosed an insulating sleeve to be placed around a cup, using a fluted material, and even shows a cup with a sleeve around it.<sup>22</sup> This itself seems obvious to me (by common sense standards), but what is interesting is that, even in light of it, the other patents are non-obvious in the eyes of the law. This is a result of the precepts.

The Coffin, Sr. patent,<sup>23</sup> which is the patent noted on the Starbucks™ coffee holder, provides a first example of the precepts. According to the patent specification itself,<sup>24</sup> previous containers (as of 1992 when this patent application was filed) had been made of wax-coated paper or polystyrene. The invention, however, discloses the use of corrugated paper/cellulosic material, which is recyclable and therefore more friendly to the environment. Hence, the non-obviousness question becomes whether it was obvious to use corrugated cardboard as a wrapper in place of traditional substances.

Naively, it would seem obvious to substitute one substance for another, when the substances are equivalent for the relevant purpose. However, the precept, as described in MPEP 2144.06 is that “In order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicant’s disclosure or the mere fact that the components are issue are functional or mechanical equivalents.” The MPEP cites three cases, *In re Ruff*, 256 F.2d 590 (CCPA 1958), *In re Scott*, 323 F.2d 1016 (CCPA 1963), and *Smith v. Hayashi*, 209 USPQ 754 (Bd. of Pat. Inter. 1980). In

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<sup>22</sup> Shikaya, Method of making liquid-tight cup, U.S. Patent 3,908,523, Sep. 30, 1975.

<sup>23</sup> Recyclable corrugated beverage container and holder, April 27, 1993.

<sup>24</sup> I have not, in this article, examined the prosecution histories of the specific patents. The key point here is to reveal the workings of the non-obviousness precepts – and the specific patents are presented simply as examples.

one of these, *Scott*, a paper tube was used rather than light wood or hardened foam as the core of an archery shaft, and the court judged that this change was not obvious. In contrast, in *Smith*, there was evidence that both phthalocyanine and selenium were known photoconductors in the art of electrophotography. Hence, the substitution of one for the other might be obvious. The issue seems often to come down to one of the presence or absence of suggestions in the literature. Perhaps because of the absence of literature about cup insulator design, the substitution is non-obvious.<sup>25</sup>

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<sup>25</sup> The Shikaya patent had however even used the word “corrugated” in describing the results of fluting, and mentioned several substances including paper and plastics.

The cup ring area provides several other examples of this equivalence principle. Thus, there are patents where the insulation is provided by “semi-spherically shaped depressions distributed on substantially the entire inner surface of the band so that each depression defines a non-contacting region of the band,”<sup>26</sup> and on use of hot-melt glue dots to create an air gap between the holder and the hot beverage.<sup>27</sup>

The “semi-spherically shaped depression” patent can also be used to exemplify a different precept. This patent may well be the Java Jacket discussed above, for it was issued to an Oregon inventor, and is written in a way that emphasizes the interlocking of the opposed slits at the ends of the band as a way to join the ends of the band to make a loop. (The claims, however, emphasize the depressions.) Here, the new non-obviousness issue is posed by the way the ends of the wrapper were joined, and is formally one of “combining references.” It was certainly well-known that cardboard wrappers would keep the coffee drinker’s hands cool. It was further well-known that opposing slits can be used to join the ends of a piece of cardboard . Was it then obvious to combine these two ideas?

MPEP 2143.01 states that “[t]he mere fact that references can be combined or modified does not render the resulting combination obvious unless the prior art also suggests the desirability of the combination.” Among the cases cited in the MPEP’s discussion of the issue is *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988), which involved a system for detecting and measuring certain nitrogen compounds by using a gas chromatograph, a converter to oxidize the nitrogen compounds into nitric oxide, and a nitric oxide detector. Two previous references were relevant – one disclosed an analogous approach to monitoring certain sulfur compounds, and the other described nitric oxide detectors. Although the examiner and the Board of Patent Appeals thought it obvious to substitute the nitric oxide detector in the system, the court found that there was no support for such a conclusion.

Application of this principle on [not] combining references has led to a number of other cup wrapper patents. One involves use of interengaging or Velcro tabs to lock together and form

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<sup>26</sup> Sorenson, U.S. Patent 5,425,497, Cup Holder, June 20, 1995. Claim 1 is quoted.

<sup>27</sup> Smith, U.S. Patent 5,669,553, Insulating cup sleeve, September 23, 1997.

a handle attached to the wrapper;<sup>28</sup> another involves making the sleeve big enough that it can help keep the cup from tipping over;<sup>29</sup> and still a further one makes part of the wrapper transparent, so that advertizing can be read through the wrapper.<sup>30</sup>

#### 4 Evaluation

At least in my judgment, these patents in general fail the common-sense test. If they were to be referred back to the person of reasonable skill in the art, that person simply isn't very bright. And the specific doctrines, as defined by the appellate courts, permit the patenting of extremely trivial innovations. I must admit that, sometimes, a change of substance or a combination of ideas can be a deeply important and surprising advance on the prior art. Most such changes or combinations, however, simply reflect the normal process that any of us, let alone a person of ordinary skill in the specific art, would normally employ. The result for the law is a waste of human resources on trivial issues (in patent prosecution, litigation, and licensing); the result for the market is patents on specific design solutions rather than just on genuine innovations; the result for the economy is the drag of monopoly.

## 2 THE LEGAL BACKGROUND

It is useful to explore the broader legal background with somewhat greater care.

### 1 Before 1952

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<sup>28</sup> Effertz, U.S. Patent 5,147,067, Insulated jacket for beverage container, Sept. 15, 1992.

<sup>29</sup> Libit et al, U.S. Patent 6,032,826, Cup holder, March 7, 2000.

<sup>30</sup> Alpert, U.S.. Patent 6,182,855, Holder for a container, February 6, 2001.

Although the standard for the judicially-created non-obviousness doctrine was perhaps presented most clearly in *Hotchkiss* in 1851, the era of patent law from the first patent act in 1790<sup>31</sup> until the 1952 revision, was marked by a variety of Supreme Court statements inserting and applying such a doctrine as a form of federal common law.<sup>32</sup> The standards applied, however, were quite variable, as is quite understandable for what must, in any event, be a form of judgment call.

However, as suggested from the discussion above, there were completely different types of standard. One type, used over the years, involved precepts such as those discussed in connection with coffee cup rings. For example, one case dealt with combinations: “Merely bringing old devices into juxtaposition, and there allowing each to work out its own effect without the production of something novel, is not invention.”<sup>33</sup> And another stated:

The use of one material instead of another in constructing a known machine is, in most cases, so obviously a matter of mere mechanical judgment, and not of invention, that it cannot be called an invention, unless some new and useful result, an increase of efficiency, or a decided saving in operation, is clearly attained.<sup>34</sup>

Although these cases did not necessarily speak of the person of ordinary skill, the language which was used in the 1851 *Hotchkiss* case, they were certainly building on such a concept and attempting to find relatively precise formulations for distinguishing “real” inventions from lesser advances in a variety of different contexts.

Late in the 19<sup>th</sup> century, the Court began also to consider historical and economic factors, in which the success of the product in the marketplace and whether the product filled a long-felt need were perhaps the most significant. These factors are generally now known as “secondary factors.” After considering precepts of the type just discussed, one of the leading cases went on in considering the patentability of the use (essentially a substituted material) of hard rubber as a

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<sup>31</sup> Session II, Ch. 7.

<sup>32</sup> See generally J. Schlicher, *Patent Law: Legal and Economic Principles* (1992), pp 5-10 through 5-48.

<sup>33</sup> *Hailes v. Van Wormer*, 87 U.S. 353, 368 (1874).

<sup>34</sup> *Hicks v. Kelsey*, 85 U.S. 670, 673 (1874).

holder for false teeth:

The properties of vulcanite were well known; but how to make use of them for artificial sets of teeth remained undiscovered. . . . But when revealed its value was soon recognized, and no one seems to have doubted that the resulting manufacture was a new and most valuable invention . . . The evidence . . . shows that it has wrought a revolution in dental practice, and that many thousand of operators are using it in preference to older devices. All this is sufficient, we think, to justify the inference that what Cummings accomplished was more than a mere substitution of one material for another; more than the exercise of mechanical judgment and taste; that it was, in truth, invention.<sup>35</sup>

This standard uses an entirely different kind of evidence. By taking into account what goes on in the market, it is in some sense more reliable than the more abstract principles just discussed (although it is important to consider whether the success of the product is in part a result of the use of the patent to exclude competitors). But some of this evidence is unavailable to the patent examiner and is available only later during an infringement dispute. To the extent that this kind of evidence is used, it is impossible to know whether a patent is valid until it has been in force for a number of years.

Two other important developments came in the mid 20<sup>th</sup> century, both at the hand of Justice Douglas. The first was the “flash of creative genius” test announced in *Cuno Corp. v. Automatic Devices Corp.*<sup>36</sup> This was a higher standard than had previously been imposed, and was clearly rejected in the 1952 Act.

Justice Douglas’s other key step in this area was to constitutionalize the non-obviousness test. Earlier courts had built their non-obviousness doctrine on an economic foundation:

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<sup>35</sup> Smith v. Goodyear Dental Vulcanite Co., 93 U.S. 486, 495 (1887).

<sup>36</sup> Note that, even though Justice Douglas is often criticized for his position in this case, he wrote for seven members of the Court, and the concurring opinion by Justice Stone dealt with a different issue. Justice Frankfurter concurred in the result and joined in Justice Stone’s concurrence.

It was never the object of those [patent] laws to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufacturing . . . Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention. It creates a class of speculative schemers who make it their business to watch the advancing wave of improvements, and gather its foam in the form of patented monopolies, which enable them to lay a heavy tax upon the industry of the country, without contributing anything to the read advancement of the arts. It embarrasses the honest pursuit of business with fears and apprehensions of concealed lies and unknown liabilities to lawsuits and vexatious accountings for profits made in good faith.<sup>37</sup>

In a concurring opinion in 1950, Justice Douglas, joined by Justice Black, then took the key transitional step of tying such logic to the clauses of the Constitution:

. . . every patent case involving validity presents a question which requires reference to a standard written into the Constitution. Article I, § 8 contains a grant to the Congress of the power to permit patents to issued. But, unlike most of the specific powers which Congress is given, that grant is qualified. The Congress does not have free rein, for example, to decide that patents should be easily of freely given. The Congress acts under the restraint imposed by the statement of purpose in Art. I, § 8. The purpose is to promote the Progress of Science and useful Arts . . .<sup>38</sup>

He went on to argue that this implied a standard that the invention had to make a distinctive contribution to scientific knowledge, and concluded with a parade of horrors of obvious patents that had come before the Court over the years.

## 2 The 1952 Act

The key drafter of the 1952 Act was P.J. Federico, a patent examiner whose services were offered to the House Patents Subcommittee. He was assisted by a two-person committee created by the patent bar. Giles Rich, then a New York patent lawyer, was a member of this

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<sup>37</sup> Atlantic Works v. Brady, 107 U.S. 192, 200 (1883) .

<sup>38</sup> Great A.& P. Tea Co. v. Supermarket Corp., 340 U.S. 147, 154 (1950).

committee, and played a very major role in drafting § 103.<sup>39</sup> (He was then appointed to the CCPA in 1956, and remained on the CAFC when it took over from the CCPA in 1982.)

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<sup>39</sup> G. Sirella, 35 U.S.C. § 103: From Hotchkiss to Hand to Rich, the Obvious Patent Law Hall-of-Famers, 32 J. Marshall L. Rev. 437 (1999); N. Smith, Remembrances and Memorial: Judge Giles S. Rich, 1904-1999, 14 Berkeley Tech. L. J. 909 (1999).

The 1952 Act was almost certainly intended to codify the judicial non-obviousness standard, as that standard existed before Justice Douglas' use of the "flash of creative genius" concept. This is the clear implication of the legislative history, embodied in a memo by Charles Zinn, the Codification Counsel to the Coordination Subcommittee of the Judiciary Committee of the House, that is published as part of the legislative history.<sup>40</sup> As Zinn writes:

Section 103 is a restatement of the rule invalidating patents for lack of invention or lack of patentable novelty which has long been recognized by the courts and other authorities but has not before been spelled out in the statute.

The second sentence of this section providing that patentability shall not be negated by the manner in which the invention was made eliminates the "flash of genius" concept that has been considered as an essential element of patentability since the *Cuno* case.<sup>41</sup>

Essentially the same position was taken by Federico, himself, writing a quasi-official commentary at the time of the act:

There has been some discussion as to whether section 103 modifies the so-called standard of invention. . . . While it is not believed that Congress intended any radical change in the level of invention or patentable novelty, nevertheless, it is believed that some modification was intended in the direction of moderating the extreme degrees of strictness exhibited by a number of judicial opinions over the past dozen or more years; that is, that some change of attitude more favorable to patents was hoped for.<sup>42</sup>

This is also the position taken by the leading initial judicial interpretation of the Act, by Learned

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<sup>40</sup> The history is in Smith, *supra*. The commentary is in 2 1952 U.S.C.C.A.N. 2507 (1952).

<sup>41</sup> *Id.* at 2517.

<sup>42</sup> P.J. Federicom Commentary on the New Patent Act, reprinted in 75 JPTOS 161, 183 (1993).

Hand in 1955.<sup>43</sup>

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<sup>43</sup> Lyon v. Bausch & Lomb Optical Co., 224 F.2d 530 (1955).

It is not at all clear, however, that this was Judge Rich's goal. He made his position clear in a 1960 article (well after the Act), published in both the *George Washington Law Review* and the *Journal of the Patent Office*, and also presented in 1959 speeches.<sup>44</sup> Judge Rich began with an argument against overexpansion of the force of the Constitutional language that a patent had to "promote the progress of . . . useful arts," and argued that it was appropriate for a patent to relate to the useful arts rather than, as Justice Douglas had argued, to science. He then went on to argue against the idea that an invention needed to be better than the state of the art to be patentable:

Patents are not Nobel or Pulitzer prizes! They are not for *exceptional* inventions but for average inventors and should not be made hard to get. True, they are temporary monopolies, but therein alone lies their power as inducements to invent, to disclose, to invest, and to design around. Why must an invention be a commercially hot number to be patentable? If it is a total dud, how is the public injured by a patent on it? A monopoly on something nobody wants is pretty much of a nullity.<sup>45</sup>

And, in his rejection of the idea that the invention does not have to be better, he explained non-obviousness:

Let us consider first "progress in the useful arts." How is such progress actually made? For one thing it is made by the constant increment of improvements on what we already have, produced both by the expected skill of ordinary workers in the arts and by the unobvious developments which would not occur spontaneously from the application of such ordinary skill. The former inventions are never patentable. Why? Because they will be made anyway, without the "fuel of interest" which the patent system supplies. The unobvious improvements, if new and useful, are patentable if proper steps are taken, and the bulk of issued patents are probably granted for this class of invention.

### 3 *Graham* and interpretation of the 1962 Act

The Act reached the Supreme Court in *Graham* in 1966. Justice Clark, speaking for a unanimous Court save for two recusals, restated the importance of the Constitutional arguments:

The Congress in the exercise of the patent power may not overreach the restraints imposed by the stated constitutional purpose. Nor may it enlarge the patent monopoly without regard to the innovation, advancement, or social benefit gained thereby. Moreover, Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available. Innovation, advancement, and things which add to the sum of useful

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<sup>44</sup> G. Rich, *The Principles of Patentability*, 42 JPOS 75 (1960).

<sup>45</sup> *Id.* at 85.

knowledge are inherent requisites in a patent system which by constitutional command must “promote the Progress of . . . useful Arts.”<sup>46</sup>

The Court went on to discuss the perspective of Thomas Jefferson, often viewed as the father of the U.S. patent system:

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<sup>46</sup> 383 U.S. at 5-6.

[Jefferson] rejected a natural-rights theory in intellectual property rights and clearly recognized the social and economic rationale of the patent system. The patent monopoly was not designed to secure to the inventor his natural right in his discoveries. Rather it was a reward, and inducement, to bring forth new knowledge. The grant of an exclusive right to an invention was the creation of society — at odds with the inherent free nature of disclosed ideas — and was not to be freely given. Only inventions and discoveries which furthered human knowledge, and were new and useful, justified the special inducement of a limited private monopoly. Jefferson did not believe in granting patents for small details, obvious improvements, or frivolous devices.<sup>47</sup>

Summarizing its position, the Court

concluded that the 1952 Act was intended to codify judicial precedents embracing the principle long ago announced by this Court in *Hotchkiss v. Greenwood*, 11 How. 249 (1851), and that, while the clear language of § 103 places emphasis on an inquiry in obviousness, the general level of innovation necessary to sustain patentability remains the same.<sup>48</sup>

The Court exemplified its analysis by discussing two examples of patents that should be rejected on non-obviousness grounds, and, in a companion case,<sup>49</sup> one that should upheld against a non-obviousness rejection. The two patents discussed in *Graham* involved relatively minor design changes, one in the way two parts were assembled in a plow shank,<sup>50</sup> and one in the way a spray cap cover for insecticides was screwed on.<sup>51</sup> In both cases, the Supreme Court found the invention obvious. The patent upheld in the companion case involved a battery that appeared to

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<sup>47</sup> Id. at 13.

<sup>48</sup> 383 U.S. at 3-4.

<sup>49</sup> *United States v. Adams*, 383 U.S. 39 (1966).

<sup>50</sup> U.S. Patent 2,627,798.

<sup>51</sup> U.S. Patent 2,870,943, Scoggin, 1959.

use familiar elements, but actually worked in spite of strong prior scientific judgments that it would not work.<sup>52</sup>

#### 4 The position of the CAFC

The Supreme Court's position is clearly not that of Judge Rich, the statute's drafter. Yet, the Supreme Court rarely intervenes in patent cases, leaving many of the issues to the CAFC. In fact, the actual practice of the CAFC, and therefore of the PTO, has drifted well away from that of the Supreme Court over the years prior to the short "flash of genius" period. An obvious example is provided by the precepts discussed above in connection with the coffee ring patents.

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<sup>52</sup> U.S. Patent 2,322,210, 1943 .

Indeed, the Court offers reason to reject the first MPEP precept discussed above and to question the second. In contrast to MPEP 2144.06, regarding equivalents as non-obvious unless the equivalency was recognized in the prior art, the Court quoted Jefferson that “[A] change of material should give no right to a patent. As to the making a ploughshare of cast rather than of wrought iron; a comb of iron instead of horn or ivory . . .”<sup>53</sup> And, more arguably, the battery patent that was upheld involved a combination that would have been rejected by a person reasonably skilled in the prior art;<sup>54</sup> the burden of proof is reversed from that of MPEP 2143.01 in which the combination is non-obvious unless there were suggestions of the combination in the previous art.

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<sup>53</sup> T. Jefferson, Letter to Isaac McPherson (Aug. 1813), VI Writings of Thomas Jefferson, at 181, as quoted in 383 U.S. at 10.

<sup>54</sup> 383 U.S. at 23-24.

These are not the only examples of a low CAFC standard.<sup>55</sup> Indeed, the numbers presented in a 1995 study of CAFC decisions on appeals from lower courts show that the CAFC upheld 86.8 % of decisions holding a patent valid on non-obviousness grounds, but only 59.9 % of those holding a patent invalid on the same grounds.<sup>56</sup> The trends of CAFC decision-making are somewhat less clear but may be toward lowering the standard even further. It must be admitted that the cases are so varied that it is always possible to find strong examples and counterexamples on each side. The one clear trend emerging in the 1995 study is of decisions on appeal from the PTO itself, which shows the CAFC becoming slightly more strict with respect to non-obviousness and upholding more PTO rejections during the late 1980s, but then going quite far the opposite way and reversing a significantly greater share of PTO non-obviousness rejections during the early 1990s.<sup>57</sup> There is also evidence that the CAFC judges appointed more recently are more likely to uphold a patent against a non-obviousness argument.<sup>58</sup> Taking into account trial courts as well as the CAFC, non-obviousness is nevertheless the leading basis of patent invalidity, a basis in 42 % of invalidities – but non-obviousness arguments are accepted only 36.3 % of the time.<sup>59</sup>

### 3 AN ECONOMIC ANALYSIS

Although the Court's standard is clearly based on the Constitution; it is at the same time one that is most easily interpreted in economic terms.<sup>60</sup> Indeed, like the Sherman Act, the

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<sup>55</sup> For general analysis, see R. Desmond, Nothing Seems Obvious to the Court of Appeals for the Federal Circuit: The Federal Circuit, Unchecked by the Supreme Court, Transforms the Standard of Obviousness Under the Patent Law, 26 Loyola L.A.L.Rev. 455 (1993); L. Kastriner, The Revival of Confidence in the Patent System, 73 JPTOS 5 (1991).

<sup>56</sup> D. Dunner, J. Jakes, & J. Karceski, A Statistical Look at the Federal Circuit's Patent Decisions: 1982-1994, 5 Fed. Cir. B. J. 151 (1995). My calculation uses the numbers in Table 2 on page 163, combining appeals from the district courts, the International Trade Commission, and the Court of Claims, and treating a vacation as equivalent to a reversal.

<sup>57</sup> Id. at 166.

<sup>58</sup> In a study of cases between 1989 and 1996, judges appointed before 1982 rejected nonobviousness arguments in 31 votes out of 61 (50.8 %), while judges appointed later rejected the arguments in 93 votes out of 140 (66.4 %). J. Allison & M. Lemley, How Federal Circuit Judges Vote in Patent Validity Cases, 27 Florida State Univ. L. Rev. 745 (2000). For these numbers,  $\chi^2 = 5.655$ , indicating that the difference is valid at about the 2.5 % level.

<sup>59</sup> J. Allison & M. Lemley, Empirical Evidence on the Validity of Litigated Patents, 26 AIPLA Q.J. 185, 208-09 (1998).

<sup>60</sup> Constitutional analysis seems especially appropriate in an area like intellectual property in which the interests of the few, i.e. the intellectual property rights holders, are more

combination of the Constitution and the Patent Act could, using the Court's logic, be read as an instruction to make an economic policy balance. (And one of the tragedies of patent jurisprudence is that it has tended to be based on very narrow statutory and common-law patent principles rather than on policy analysis.)

A patent confers a monopoly right. It is, therefore, *per se*, an interference with market pricing and with economic optimization; such interference can be justified only if the patent can actually be expected to encourage innovation, by preventing copiers from appropriating the benefits of an inventor's investment in research and development. Thus, the benefits of the innovation must (at least on average and as predictable) be comparable to the costs of the monopoly. We should provide a monopoly only for something that is *really* nonobvious.

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readily brought to bear in the Congress than are the more diffuse interests of the many, who will have to pay the market costs of creating an intellectual property right. This is a situation quite analogous to that described in the famous *Carolene Products* footnote, in which Justice Stone suggested in effect that "legislation which restricts those political processes which can ordinarily be expected to bring about repeal of undesirable legislation" might be "subjected to more exacting judicial scrutiny." *United States v. Carolene Products Co.*, 304 U.S. 144, 152 n. 4 (1938).

The balance of innovation and monopoly cannot be made easily. But some of the issues can be noted by looking at both the incentives and the costs. The incentive benefit of the patent system is clearly greatest for products that require significant research and development and can be easily copied. As one commentator puts it, “[s]ection 103 forbids issuing a patent where the cost and risk of independent research to obtain an invention are low enough that an ordinary researcher would be expected to incur them at about the same time without the additional incentive of a patent.”<sup>61</sup>

## 1 Achieving the benefits of the patent incentive

The straightforward intuition surrounding the incentive benefits of the nonobviousness standard is that a general level of research or normal product design and development has to be assumed. Only research beyond that done as part of normal product design and development should be rewarded with a patent. Routine redesign should not be enough, for there is no need for monopolies as an incentive for such research.<sup>62</sup>

An examination of industry practice is arguably circular, for whatever level of research is undertaken in an industry is a function of many things, including available supra-normal

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<sup>61</sup> Schlicher, supra at 5-3.

<sup>62</sup> “One way of understanding this distinction is that patents are unnecessary to bring about mundane improvements that are within easy reach of those working in the field, but may be needed to motivate inventors to pursue the nonobvious advances that require something beyond routine work.” R. Eisenberg, Taking Stock: The Law and Economics of Intellectual Property Rights” Analyze This: A Law and Economics Agenda for the Patent System, 53 *vand. L. Rev.* 1081 (2000).

profits,<sup>63</sup> the market interest in new technology, and the availability of new technologies, and the patent system applies in the particular situation. Moreover, there are certainly industries in which the level of research is set by economic forces, and then patents are obtained on the basis of whatever invention has occurred.<sup>64</sup> (In essence, the patent system has incited activity in the corporate patent department rather than in the corporate research department.)

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<sup>63</sup> Remember that, without some form of monopoly or oligopoly rent, there will be no way to support research and development – proprietary position is essential. Although it may derive from an intellectual position, it may instead derive from a variety of other factors such as regulatory position, barriers to entry, or a rapid product cycle (as in the case of semiconductors).

<sup>64</sup> See B. Hall and R. Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995*, 32 *Rand J. of Econ.* 101 (2001).

Yet, there are recent economic models by Hunt and by O'Donoghue that have attempted to explore the patentability or non-obviousness standard,<sup>65</sup> and have built models in which the level or character of R & D is determined by the patent system, and the inventive step standard is varied. In these models, the firm that achieves and patents an innovation gains a dominant market position against its competitors; that position survives until the next patented invention in which a new firm may become dominant. There is, in these models, an intuitively static effect and an intuitively dynamic effect of patents. The static effect is that a patent deriving from current research will provide market benefit. But the dynamic effect is that a firm will increase its R & D or aim for more significant innovations as a result of the hope of having a period of dominance and the fear of remaining in or being placed in a subordinate position. In general, increasing the patentability standard weakens the static effect of the patent system and strengthens the dynamic effect. And the models go on to demonstrate that, at least up to a point, the dynamic benefits of strengthening the non-obviousness standards outweigh the static costs of that strengthening.

Is there reason to believe that we are now below the point at which the benefits of strengthening the non-obviousness standard peak and begin to fall? The answer is almost certainly yes and is suggested by a little thought about the actual static and dynamic interests of firms. In how many industries are firms seriously investing in research out of hope of gaining a patent-based monopoly or out of fear that they will be displaced by other firms wielding improved products protected by patents that might actually put them out of business? The pharmaceutical industry is the only one I can think of in which there is really hope of gaining a patent-based monopoly. In many industries, e.g. semiconductors, there are patents, but they are much more a legal game than an incentive to research, which is driven by a rapidly-moving product cycle.<sup>66</sup> And survey evidence, assembled by Cohen et al, strongly suggests that, in many industries, patents are among the least emphasized sources of competitive advantage.<sup>67</sup>

Indeed, the Hunt study implies the availability of a rough and ready way to decide. That study shows that the optimal level of non-obviousness in an industry is higher if the industry is already innovating rapidly. In short, a comparison with the existing rate of innovation in the industry, circular though it be, may not be a bad way to define what is likely to happen without a patent incentive. The person of ordinary skill in the art becomes the typical, somewhat

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<sup>65</sup> R. Hunt, Nonobviousness and the Incentive to Innovate: An Economic Analysis of Intellectual Property Reform, Federal Reserve Bank of Philadelphia, Working Paper No. 99-3 (March 1999), and T O'Donoghue, A patentability requirement for sequential innovation, 29 Rand J. of Econ. 654 (1998).

<sup>66</sup> See Hall and Ziedonis, *supra*.

<sup>67</sup> W. Cohen, R. Nelson, & J. Walsh, Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not), NBER Working Paper No. W7552 (February 2000).

innovative, scientist or engineer in the particular industry. (And the analysis might reasonably take into account whatever is known about the special necessity for patents in some industries as in pharmaceuticals.)

## 2 Avoiding the costs of patents not needed as incentives

The cost side of the equation must also be taken into account. For Judge Rich, the costs of the patent issued on the obvious invention are small, for such an invention will fail in the market place. And one of the leading economic analysts of the patent system argues that even the cost of monopoly is only minor, since economic theory argues that a license will be granted, and the cost of the license is only a transfer payment – the only real economic cost is that of any misallocation produced by the mispricing of the patented product.<sup>68</sup>

These arguments understate the costs of the unneeded patents. The obvious cost is the economic cost of monopoly. That cost may be enormous in light of the CAFC's assertion of exclusive jurisdiction over patent-antitrust issues and general resolution of this issues in favor of the patent system. By holding, for example, that it is essentially never an antitrust offense to refuse to license a patent, they can permit a firm to hold a very substantial monopoly, and one that is not mitigated by grant of a license.<sup>69</sup> Moreover, the competition issues go well beyond traditional patent-antitrust ones – in some industries, the leading players are able to fund the acquisition of large portfolios of patents which they can use as competitive levers against weaker firms.<sup>70</sup> This sounds likely to provide a way to entrench power in existing industry leaders rather than to encourage new ideas.

Moreover, as the patent system is reaching into areas like computer programs and business methods,<sup>71</sup> an invention that is arguably obvious, e.g. a computer method for carrying out an important financial calculation, may in fact cover not a product easily avoided or designed around, but a product central to the operation of our contemporary society. There are also important issues in biotechnology, where there are questions as to the obviousness or not of certain basic patents. These patents can impose large costs, including the lost benefits of inventions foregone out of fear that a product cannot be produced without obtaining a license that

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<sup>68</sup> Id. at 5-7.

<sup>69</sup> An examples of a recent intellectual-property-antitrust balance favoring the intellectual property side (albeit in copyright law) is *In re Independent Service Organizations Antitrust Litigation*, 203 F. 3d 1322 (CAFC 2000). The jurisdiction of the CAFC is described in *Christianson v. Colt Indus. Operating Co.*, 486 U.S. 800 (1988), interpreting 28 U.S.C. §. 1295.

<sup>70</sup> Hall and Ziedonis, supra.

<sup>71</sup> *State Street Bank & Trust Co. v. Signature Financial Group*, 149 F.3d 1368 (CAFC 1998).

may be unavailable.<sup>72</sup>

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<sup>72</sup> M. Heller & R. Eisenberg, Can Patents Deter Innovation: The Anticommons in Biomedical Research, 280 Science 698 (1998).

Finally, the costs go still further to include the operational costs of the patent system, which means the costs of acquiring patents, the costs of operating the patent office, and the far greater costs of analyzing proposed products for possible patent infringement and of negotiating patent licenses.<sup>73</sup> The negotiation of and achievement of antitrust clearance for patent cross-licenses for new digital media standards such as DVD and MPEG has become a major legal industry. It is a measure of the scope of the conflicting patent problem that the PTO has prepared a memorandum on resolving patent issues through patent pools.<sup>74</sup> Unless those patents are actually encouraging innovation, it would be better not to have to negotiate the pool.

The magnitude of these cost of extra patents is so great that it is clearly essential to err on the cautious side rather than the generous side in interpreting the non-obviousness standard.

### 3 Administrability issues

There are also practical, administrative issues that a test must satisfy. First of all, the test is unavoidably a judgment call. Each of the precepts cited above (and those that will be considered in the next session) is ridiculous in most applications – but clearly right in some. We agree with Jefferson that changes of material are not the source of patentability – but there are certainly some cases (perhaps rubber for dentures) where the choice of the new ingredient seems genuinely to reach the level of invention.

It has also always been important to the PTO and to the courts to protect the inventor against the phenomenon that most inventions look obvious in retrospect — this is a genuine and proper concern, and one that shapes much of the detailed law. It tends to push the law toward “bright line” tests — but typically the use of bright line logic in order to reduce the need for judgment in non-obviousness tests tends effectively to reduce the tests to tests of novelty, where there is less need for judgment. Asking whether there was a suggestion in the prior art to

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<sup>73</sup> It is perhaps these costs which explain why the patent bar has grown so much more rapidly than has research itself. See the chart in J. Barton, *Reforming the Patent System*, 287 *Science* 1933 (17 March 2000).

<sup>74</sup> USPTO White Paper: Patent Pools: A Solution to the Problem of Access in Biotechnology Patents?, available at <http://www.uspto.gov/web/offices/pac/dapp/opla/patpoolcover.html>.

combine two references seems much closer to a novelty test than to a non-obviousness test – and using this standard as a bright line for non-obviousness effectively eliminates the non-obviousness requirement.<sup>75</sup>

#### 4 Conclusion

The examples discussed above suggest that the real standard, as applied by the CAFC, is “whether the invention would certainly have been made by a person of minimal skill in the art who is unable to integrate the different concepts present in the art .” This is not what the statute says; it is not what the Constitution demands; and it is not economically sensible. A far better interpretation of the statute – and one that may be Constitutionally required and that certainly follows the economics – would be “To grant a patent only if the invention is more substantial than that regularly made by a person of average skill in the art being funded and supported in a way that is typical in the relevant industry.”

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<sup>75</sup> See Schlicher, supra at 5-80-81.

There are two important points in this proposed standard. One is that it is industry specific. This enables building on the economic insight that it is the dynamic factor of patents – of incenting more than the average research – that is economically dominant and that the innovation standard should be higher in more innovative industries. Why not use the industry baseline? We have a sense of what that level is and can compare the research levels and imaginativeness with industry practice.<sup>76</sup> Second, this approach – of directly comparing the invention with that regularly made in the industry – creates a kind of intellectual burden against giving the patent monopoly except when it’s really needed to encourage innovation. The history of PTO and CAFC practice suggests that the burden has to be shifted if the law is to be reformed.

#### 4 DETAILS OF PLAUSIBLE REFORM

As a practical matter, it is essential to achieve any reform by judicial interpretation of the statute as noted above – the chances of legislative change to § 103 reform as slight. As described by former Commissioner Mossinghoff, “any attempt at this point to amend § 103 would be met with vigorous and successful opposition by high technology industry, inventor groups and the organized patent bar.”<sup>77</sup> However, judicial action appears much more plausible. As this paper indicates, there are strong arguments that the “correct” interpretation of § 103 defines a standard at the level used by the Supreme Court during the period before *Cuno*, that this standard is constitutionally required, that in the form described above, it is economically wise, and that it is quite different from the standard recently used by the CAFC.

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<sup>76</sup> How this standard should be applied in the event of publicly-funded research raises important questions not considered in this paper.

<sup>77</sup> G. Mossinghoff, Memo to The National Academies’ Committee on Intellectual Property Rights in the Knowledge-Based Economy, Feb. 26, 2001.

It would be pointless to explore all the various specific precepts of non-obviousness. But selection of a few examples shows that they could be reasonably revised and that a more severe standard is definable and workable.<sup>78</sup>

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<sup>78</sup> None of the specific areas considered here explores the secondary indicia, an area in which the CAFC's decisions may particularly have weakened nonobviousness standards. See R. Desmond, supra. The task, however, has already been undertaken, R. Merges, Commercial Success and Patent Standards: Economic Perspectives on Innovation, 76 Cal. L. Rev. 805 (1988).

Professor Merges emphasizes issues of the economic validity of certain uses of secondary indicia. There is also a problem that some of this information is not available at the time of patent grant and is therefore not useful to the PTO in making the patentability decision. For that reason, it will therefore not be considered in this paper which is seeking to propose new standards for the PTO.

It should be further noted that there is a real problem in reconciling the presumption of validity of a patent, 35 U.S.C. § 282, with the use of post-grant factors such as commercial success in evaluating non-obviousness. How can the examiner's decision on non-obviousness bear a presumption of validity during a later infringement action, when there are factors relevant to that later infringement action which were not available to the examiner?

## 1 The burden of proof

One general point deserves special analysis, especially in light of the proposed reinterpretation of the statute. This is the allocation of the burden of proof as to obviousness – an issue discussed in MPEP 2141.<sup>79</sup> As that provision states, “[t]he examiner bears the initial burden of factually supporting any *prima facie* case of obviousness,” and “[i]f the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of non-obviousness.” And the *prima facie* case requires:

First there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally the prior art reference (or references when combined) must teach or suggest all the claim limitations.<sup>80</sup> (MPEP 2143.)

Under the analysis of this paper, the standard is wrong – and it may follow that the allocation of the burden of bringing forward evidence is wrong. The standard for a *prima facie* case of obviousness should instead be more like:

The various ideas and components of the invention are typical of those made by persons of ordinary skill in the relevant field. Thus, if the invention amounts to a combination or modification of previous teachings, the character of the combination or modification is of a type that is typical of contemporary technological advance in the particular industry.

Or inversely, the standard for a *prima facie* case of non-obviousness would be:

The various ideas and components of the invention transcend those made by persons of ordinary skill in the relevant field. Thus, if the invention amounts to a combination or

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<sup>79</sup> See generally *In re Oetiker*, 977 F.2d 1443 (CAFC 1992).

<sup>80</sup> A claim is limited when it is restricted to a particular situation, reflecting both a particular application of the broader invention (and there is, of course, innovation in making the application) and a consequent narrowing of the scope of the claim. Thus, the inventor of the coffee cup band that folds so as to create a handle obtains a claim to coffee cup bands limited to those that fold so as to create a handle.

modification of previous teachings, the character of the combination or modification is of a type that is more significant or surprising than is typical of design improvements in the particular industry.

Either is feasible. The actual allocation of the burden of coming forward with a prima-facie case either way is very much a matter of practicalities – are there likely to be many or few inventions rejected on the new obviousness grounds. If many are likely to be rejected, then the inventor should be presenting the initial case of non-obviousness (with the possibility of rebuttal by the examiner), or, if few are likely to be rejected, the examiner should have the obligation of coming forward with the prima facie case of obviousness (again with the possibility of rebuttal).

In light of the actual pattern of patent law, it is almost certain that many would be rejected, so that the reasonable approach is for the applicant to show non-obviousness. The kind of evidence needed, a comparison with industry practice, is probably better known to the applicant – indeed many patents already include information on the reasons why the proffered invention is much better than what was happening in the industry.

I must admit that the statute can be reasonably interpreted to place the burden on the examiner – since it states that “[a] patent may *not* be obtained . . .” if the invention was obvious (emphasis added). The language, however, is hardly decisive either way,<sup>81</sup> and it is certainly normal to place on the applicant the burden of showing satisfaction of the conditions that must be met to obtain a right such as that embodied in a patent. Moreover, it is arguable that the Constitution’s requirements that the invention contribute to the progress of the useful arts cannot be satisfied if a patent can be granted without an affirmative showing that the invention goes beyond what a person of ordinary skill would have done.

## 2 Specific CAFC and MPEP precepts

There are many specific precepts developed by the courts and detailed in the MPEP; four of these are discussed here. Two (the substitution of an equivalent component and the combination of references) have already been introduced in connection with the coffee cup insulator example. The other two are the “obvious to try” doctrine, and the use of familiar means to reach an unfamiliar result.

### 1 Substitution of equivalents

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<sup>81</sup> See the discussion of burden of proof in 2 Chisum on Patents § 5.06.

The general doctrine on the substitution of equivalents was already described above, with the indication that the equivalency must already be recognized in the prior art, and that “expedients which are functionally equivalent *to* each other are not necessarily obvious *in view of* one another.”<sup>82</sup> (Emphasis by court.) As with all the precepts, this is sometimes true. But the far better standard would be one in which the applicant would have to show that the particular substitution is one that would not be reasonably expected to occur to one of ordinary skill in the art.

This is suggested by the European standard, which notes that “a skilled person’s selecting from the materials known him as suitable for a certain purpose the one which was the most appropriate had to be regarded as forming part of his normal activities. The skilled person should therefore be at liberty, within the constraints of standard technical progress, to use alternative means known by him to have the same effect.”<sup>83</sup>

Inventions that amount to an analogue of a prior invention amount to a form of substitution of equivalents. The U.S. MPEP position of course strongly implies a rejection of the obviousness of analogues. As one case states, “The expression of antibiotic resistance-conferring genes in cyanobacteria, without more, does not render obvious the expression of unrelated genes in cyanobacteria for unrelated purposes.”<sup>84</sup> This ignores the empirical point that the scientists typically choose antibiotic resistance genes for first efforts to transform organisms for such genes make it easy to identify those organisms that have been successfully transformed. And it ignores the patent law point that the new analogous invention may, under any reasonable standard, be patentable in special cases, as if the insertion of the new gene involves special difficulties that are overcome in an inventive way or leads to unexpected results.

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<sup>82</sup> In re Scott, 323 F.2d 1016, 1019 (CCPA 1963).

<sup>83</sup> Case Law of the Boards of Appeal, supra at I.D.6.6., citing T 324/94, VDO Adolf Schindling AG v. Diehl GmbH & Co., May 7, 1996.

<sup>84</sup> In re Vaeck, 947 F.2d 488, 493 (1991).

There is a key application of this analogy principle, in which it is economically important that there be a clear answer. Should computer programs embodying familiar algorithms or business method be patentable? My intuition tells me that the first person to think of putting an algorithm on a computer should have had a patentable invention, and that no one doing the same thing with a familiar algorithm thereafter should have had a patentable invention (again, unless there were special circumstances such as a difficult problem overcome). Current law, however, is not so clear. The PTO claims that computer programs that amount to an embodiment of familiar concepts are not generally patentable,<sup>85</sup> but it seems hard to reconcile that judgment with the fact of such patents as those in *State Street Bank & Trust*<sup>86</sup> (method of allocating transactions among related mutual funds) or *WMS Gaming Inc. v. Int'l Game Technology*<sup>87</sup> (electronic circuitry to replace mechanical reel in slot machine). Moreover, there is a specific statutory proposal pending to prohibit such patents, reflecting the dissatisfaction of at least some in Congress with the situation.<sup>88</sup> It would seem that, in general, the use of familiar methods (i.e.

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<sup>85</sup> See USPTO, Formulating and communicating rejections under 35 U.S.C. § 103 for applications directed to computer-implemented business method inventions, examples 9 and 10, citing *In re Venner*, 262 F.2d 91, 95 (CCPA 1958). This is particularly interesting, since *Venner* was decided well before the Supreme Court cases that supported the patentability of computer software, and there is an intermediate Supreme Court case that supports obviousness in such circumstances, *Dann v. Johnston*, 425 U.S. 219 (1976).

<sup>86</sup> Supra.

<sup>87</sup> 1996 U.S. Dist. LEXIS 13864 (ND Ill 1996). Admittedly, the electronic version permitted adjustment of the odds in ways that could not be done in the purely mechanical version.

<sup>88</sup> H.R. 1332, introduced April 3, 2001, by Mssrs. Berman and Boucher. Section 4 would amend 35 U.S.C. § 103 by adding:

(d)(1) A business method invention shall be presumed obvious under this section if the only significant difference between the combined teachings of the prior art and the claimed invention is that the claimed invention is appropriate for use with a computer technology, unless –

(A) the application of the computer technology is novel; or

(B) the computer technology is novel and not the subject of another patent or patent application.

(2)(A) An applicant or patentee may rebut the presumption under paragraph (1) upon a showing by a preponderance of the evidence that the invention is not obvious to persons of ordinary skill in all relevant arts.

putting something on a computer) with new material (i.e. a new algorithm), should not be patentable. This is what people in the computer world normally do; use of a patent is not needed to spur invention and actually takes capabilities out of the public domain.

## 2 Combining of references<sup>89</sup>

The rules on combining references were also noted above. Under current law, in general, it is not obvious to combine references unless there was a suggestion to do so in the references or in the knowledge generally available to one of ordinary skill in the art. (MPEP 2143.01) This seems still to be the balance, although there are recent cases going each way, one saying that “the level of skill in the art cannot be relied upon to provide the suggestion to combine references,”<sup>90</sup>

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(B) Those areas of art which are relevant for purposes of subparagraph (A) include the field of the business method and the field of the computer implementation.

Note that the management of the burden of proof is quite similar to that recommended more broadly in this paper.

<sup>89</sup> In preparing this section, I have been assisted greatly by research assistance performed by Shilpi Banerjee, then a second-year student at Stanford Law School.

<sup>90</sup> *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308 (Fed. Cir. 1999). The question in the case is whether it would have been obvious to punch a hole in a security tag for holding eyeglasses and to use the hole to hang the glasses from a rack for display.

and another saying that a motivation to combine can be found in the nature of the problem to be solved and from the prior art “as filtered through the knowledge of one skilled in the art.”<sup>91</sup>

The Supreme Court’s position is, however, quite different, holding that there must be some form of synergy or unexpected effect. It stated its concern in 1976, quoting a 1950 case, “Courts must scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements. . . . A pattern for a combination which only unites old elements with no change in their respective functions . . . obviously withdraws what already is known into the filed of its monopoly and diminishes the resources available to skillful men. . . .”<sup>92</sup> Based on this concern, it required that an invention be “synergistic,” i.e., quoting a 1969 case, “result[ing]. in an effect greater than the sum of the several effects taken separately.”<sup>93</sup>

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<sup>91</sup> In re Petrak, No. 00-1502 (May 25, 2001) (not citable).

<sup>92</sup> Sakraida v. Ag. Pro., Inc., 425 U.S. 273, 281(1976), quoting Great A.&P. Tea Co. v. Supermarket Corp., 340 U.S. 147 (1950).

<sup>93</sup> 425 U.S. at 282, quoting Anderson’s-Black Rock v. Pavement Co. 396 U.S. 57, 61 (1969). The brackets are the Courts.

The Supreme Court's synergy test does not seem solid: synergy may sometimes be an indication that a combination invention is non-obvious, but it seems likely that a combination may sometimes be non-obvious without bringing a synergy. At the same time, the CAFC's test is not only inconsistent with the Supreme Court, but also seems much too weak – the skilled engineer or scientist routinely combines references, and we need a test based on the likelihood that such a combination would be made by such a person. Moreover, in some sectors – such as the coffee cup sector, there is likely to be little written art suggesting the combination of references, while the combining of references is in fact something any child does.<sup>94</sup>

The EPC Board of Appeal comes much closer (but may still be too low) in saying that “the skilled person can be expected to take account of solutions to the individual problems proposed in different secondary documents in the same or neighboring technical fields.”<sup>95</sup> This would at least mean that inventive activity at the level of the problems at the ends of chapters in technical textbooks would be obvious. The reasonable expert should certainly know the kinds of combinations of ideas common in his or her technical field. Note that, in contrast with the U.S. position, the EPC approach places more direct focus on the person skilled in the art than on analysis of references. This appears typical of the EPC cases I reviewed; it is certainly closer to the standard proposed in this paper.

### 3 Obvious to try<sup>96</sup>

The principle of obviousness to try is exemplified by a 1945 CCPA case involving a patent application for use of a particular form of distillation for refining crude olefinic nitriles.

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<sup>94</sup> See Schlicher, supra at 5-80-81.

<sup>95</sup> EPO Tech. Bd. of Appeal, Tetra Pak Finance & Trading S., Method of cold cathode replenishment in electron beam apparatus and replenishable cold cathode assembly, T 552/89 (Aug. 27, 1991).

<sup>96</sup> This part relies heavily on a paper prepared by Brad Waugh, then a second-year student at Stanford Law School.

The patent was rejected on the grounds that “any one skilled in the art would naturally attempt to separate any new mixture of two liquids by azeotropically distilling them.”<sup>97</sup> The concept that an approach that is obvious to try is therefore obvious seems quite sensible, and was supported by the Supreme Court in a 1948 case on use of urea as a way to neutralize acidity in antiperspirants.<sup>98</sup>

Clearly, this concept it is not too different from a principle on combining references, where, in fact, one of the references is the general state of the art with respect to the arguably obvious method of solving a particular problem. And, like all these principles, it is a matter of degree – the success of an approach that might not be expected to work might reasonably give rise to a patentable invention.

In 1966, however, Judge Rich rejected the obvious to try principle, stating:

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<sup>97</sup> In re Carpenter, 151 F.2d 207, 208 (CCPA 1945).

<sup>98</sup> Mandel v. Wallace, 335 U.S. 291 (1948).

Slight reflection suggests, we think, that there is usually an element of “obviousness to try” in any research endeavor, that it is not undertaken with complete blindness but rather with some semblance of a chance of success, and that patentability determinations based on that as the test would not only be contrary to statute but result in a marked deterioration of the entire patent system as an incentive to invest in those efforts and attempts which go by the name of “research.”<sup>99</sup>

This was a 3 to 2 decision in which the dissenters regarded the relevant approach as one that would be taken by one skilled in the art. It came down in August 1966, shortly after *Graham*, which had come down in February that year. Judge Rich may not have believed the Supreme Court’s decision that non-obviousness standards were not changed by the 1952 Patent Act.

The CAFC and PTO law reflects Judge Rich’s positions, with a large number of decisions holding that obviousness to try amounts to obviousness coming dominantly before the mid 1960’s and a large number decided the other way coming later.<sup>100</sup> As a result, U.S. patent law will grant a patent based on an invention that reflects an approach that was obvious to try, depending on the likelihood of success that might have been expected in advance from the approach. Indeed, although the MPEP discusses the current doctrine at section 2145 (X) (B), this section must be read together with MPEP section 2143.02 on a “Reasonable Expectation of Success.” The standard of likelihood of success is naturally interpreted in a way that favors non-obviousness.

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<sup>99</sup> In re Tomlinson, 363 F.2d 928, 931 (CCPA 1966). There were several earlier cases which stated that the “subject matter as a whole” provision of the 1952 Act repealed the obvious-to-try doctrine, e.g., In re Huellmantel, 324 F.2d 998 (CCPA 1963), and In re Henderson, 348 F.2d 550 (CCPA 1965).

<sup>100</sup> B. Waugh, Should the old patent law doctrine of “obvious to try” play a new role in a modern standard of nonobviousness?, Directed research paper, April 6, 2001, Stanford Law School.

EPC practice is probably slightly more strict than US practice. The EPC uses a standard of “reasonable expectation of success.” In applying this standard, it explores whether the researcher would have expected to be successful and recognizes that “even if an experiment is obvious to try for the skilled person, it is not necessarily true that the person would have any reasonable expectation of success when embarking on it.”<sup>101</sup> But it is demanding in defining the standard of expectation: “any allegation of factors putting in jeopardy the reasonable expectation of success must be based upon technical facts and an absence of evidence that a given factor might be an obstacle to carrying out an invention would not be taken as an indication that this invention could not be achieved, nor that it could.”<sup>102</sup>

The issues surrounding this principle are particularly interesting, and, especially as described by Judge Rich, pose very sharp questions about the purpose of the patent system. His point is, in essence, that research that is obvious to do (albeit perhaps expensive) should be rewarded by a patent monopoly when successful. And it is a point that arguably reflects the incremental character of scientific research.

This is nevertheless hardly the Jeffersonian position. In general, there is little doubt that such routine research would be done in the absence of a patent system, assuming the market is important enough. Indeed, several different firms might do parallel research and produce products that would compete with one another.

But, to be fair to Judge Rich, it should be recognized that there are economic circumstances in which his logic works. Suppose there is enough competition in an area that, without patents, there is little chance for a firm to obtain the monopoly rents necessary to recover even routine investment in new research and product design. Then, without the patent, there is competitive pricing and no innovation. With a patent, available under Judge Rich’s standard, however, each firm has the incentive to seek improvements and, if possible, knock the others out (assuming the invention has significant competitive value). The result is routine innovation and higher prices. With a higher patentability standard, the result may be no progress (because of the difficulty of invention beyond the minor level) or it may be innovation beyond the routine level (because there really is the potential for major and economically significant innovation).

How likely is it that an industry will be in this situation in which even routine innovation depends on the existence of patents? My judgment is that, in general, there are relatively few sluggish industries in which the patent system is essential to routine innovation;. This may be the implication of the Hunt model and Cohen et al survey discussed above (although a sluggish industry does, under the model, require a lower standard of patentability). Moreover, in

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<sup>101</sup> EPO Tech Bd. of Appeal, T 187/93, *Genentech, Inc. v. Chiron Corp*, Vaccines based on membrane bound proteins and process for making them, March 5, 1997.

<sup>102</sup> EPO Tech. Bd. of Appeal, T 333/97, *Monsanto v. Novartis*, Effecting somatic changes in plants through the use of negative strand RNAs, Oct 5, 2000.

a sluggish industry, the choice is between a system with higher standards which would imply the availability of monopoly rents only for significant innovation, and a system with lower standards implying routine innovation and possibly monopoly rents. The first is probably a better balance for society. The consequent patent principle is clear: it is obvious to do what is obvious to try, unless there are special circumstances, as if the results of the trial are surprising.

The hard application of this principle is genomic-based pharmaceuticals, in which there is a strong argument that it would be obvious to try particular human proteins as pharmaceuticals, and there would be no investment without the patent system. This is a situation in which the industry-to-industry flexibility inherent in the standard described above leaves it possible to make intelligent differentiations between the standards used in different areas and to take the patenting practice of industry into account. Indeed, the standard proposed in this paper, which looks more realistically at the actual role of patents as incentives would permit the PTO and courts to recognize that patents on pharmaceutical products are essential to provide the incentive to innovation in that industry.

#### 4 Use of familiar means to reach an unfamiliar result

My recommendations on obviousness to try – as well as the trend of patent law to grant patents on more and more abstract inventions – give rise to a further important issue for the patent system: when should the unfamiliar product of an obvious approach be patentable?. A few examples will demonstrate the importance of the issue. A genome can now be sequenced by obvious processes – should any of the information contained in the genome be patentable? A protein structure is known – should the corresponding DNA sequence (which involves a different chemical and which, because of the degeneracy of the genetic code, must be identified as one of many that may code for a particular protein)?<sup>103</sup>

Under current law, these products are generally patentable. One reason is the obviousness to try principle itself and its implicit decision that routine research should be rewarded. Moreover obviousness has typically been described in terms of chemical or physical similarity rather than of logical ability to learn the answer. Thus, “[t]he fact that one can conceive a general process in advance for preparing an *undefined* compound does not mean that a claimed *specific* compound was precisely envisioned and therefore obvious. A substance may indeed be defined by its process of preparation. That occurs, however, when it has already been prepared by that process and one therefore knows that the result of that process is the stated compound.”<sup>104</sup> The result is that, because of the redundancy of the genetic code, a gene sequence is not obvious from the protein sequence that it codes for.

Is this wise? The answer is almost certainly no, and for several reasons. First, the same

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<sup>103</sup> In re Deuel, 51 F.3d 1552 (Fed. Cir. 1995).

<sup>104</sup> Id at 1559.

factors that apply to obviousness to try generally apply here – much of the necessary research can be motivated without the patent system. Second, there is something unseemly about giving a patent to the product of a routine process or even of a machine – surely the sequencing machine is at the level of ordinary skill in the art!

Third, and of much broader significance, many of these patents cover information, e.g. a gene sequence or protein coordinates. Not only does information about nature in some way seem already obvious, but we should be hesitant to use the patent system to give preemptive rights on information, as distinguished from new products.<sup>105</sup> Such controls over information can be extremely harmful to future researchers and scholars, and can remove information from the public domain.<sup>106</sup>

## 5 CONCLUSIONS

The precepts just discussed are examples only, and the reader of MPEP will find a substantial number of other principles. But this sample of possible revisions to MPEP precepts shows that it should be possible to rewrite the detailed body of law embodied in the MPEP in a way that significantly changes the legal standard of non-obviousness.

That standard should then, as suggested in this paper, be modified in a way to require the patent applicant to demonstrate that the proposed invention reflects a standard of inventiveness higher than that which is normal in the industry involved. This changes the effective burden of proof. More significantly, it effectively requires the applicant and the PTO to look at what is happening in industry, permitting an empiricism that can be used to fine tune the patent law across different industries. And the empiricism that it demands is more closely related to the statute's mandate of the person skilled in the art than is the use of secondary factors such as long-felt need and commercial success.

This standard is not only consistent with the Constitution; it is also likely to leave us with a better patent system, more able to encourage innovation, and less usable for legalistic and harassing purposes. We really do have too many patents, and the development of rational standards for non-obviousness is one way of decreasing the number without harming incentives.<sup>107</sup> The grant of a patent should be available only for an exceptional innovation.

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<sup>105</sup> It must, of course, be recognized that the patent law speaks of “Whoever invents or discovers . . .” 35 U.S.C. § 101.

<sup>106</sup> See J. Barton, *Patents, Genomics, Research, and Diagnostics*, forthcoming under the auspices of the Association of American Medical Colleges.

<sup>107</sup> In face of the fundamental problem that the non-obviousness call is a judgment and that the examiner may be tempted to shade judgments in favor of the applicant so that the issue is kept open for reconsideration in litigation, it seems possible that a procedural option such

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as a reexamination or laying open procedure may be essential. But that approach must apply standards different from those currently applied by the CAFC; otherwise it provides a review against principles that have already been found to lead to overly many patents.