

**THE SUPREME COURT, *BILSKI*, BUSINESS METHODS, AND SENSIBLE LIMITS
ON PATENTS**

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THE SUPREME COURT, *BILSKI*, AND SENSIBLE LIMITS ON PATENTS

John W. Schlicher¹

Technological change is a major and probably the main source of economic growth. Patent law exists to increase the rate of technological change and uses market forces and judgments to determine the direction of change. However, patent law has its limits and the Supreme Court will for the umpteenth time define those limits. The Supreme Court will decide whether Bernard Bilski might be granted a patent.

I. SUMMARY

This paper describes the *Bilski* issue - whether a patent may be granted for method a commodity dealer could use to reduce its market risk when buying and selling. (Section II) It briefly describes the law of patentable subject matter. (Section III)

Sensibly understood, the limits on patentable subject matter operate to prevent a patent when some product or process does not provide the type of benefit patent law exists to achieve or when certain types of costs of using patents would greatly exceed the benefit. (Section IV)

Patent law exists to increase incentives for R&D on new product and process designs, that is technology, with potential to lead to economic growth by increasing the demand and supply products and services. The *Bilski* process does not provide this type of benefit. Even if it did, this is not a sufficient reason to declare the process potentially patentable.

Patent rights create costs. When inventors obtain patents, other people bear four types of costs: costs to avoid violations; costs of errors; costs of legal uncertainty; and transaction costs of licensing (not the payment to the patent owner). Patents will do more harm than good if extended to areas, where economic costs exceed economic benefits. When it is unclear whether costs will exceed benefits in some area, as it will often be, increased incentives to produce new technology should always be favored. Patents should be refused on the basis of patentable subject matter only when these types of costs are highly likely, if not virtually certain, to exceed the benefit for some type of process or product. On initial appraisal, a patent on a process such as *Bilski*'s would seem high likely to impose economic costs far greater than any economic benefits and should not be patentable subject matter.

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This paper notes that if the *Bilski* process is patentable, there are no apparent limits on patentable subjects, a point several Justices illustrated during the *Bilski* argument. (Section V) The paper explains why several Justices were right to ask why a process that is not patentable should become patentable merely by changing the claim to say some steps of the process are carried out using some machine or changing the claim to say the invention is some machine or group of machines that carries out the steps of the process. (Section VI) The same considerations that should guide what processes are patentable should also guide what machines are patentable. Processes such as *Bilski*'s should not be patentable merely because some steps could be carried out with a general purpose machine such as a telephone or a computer.

This paper also discusses the machine-or-transformation test the Court of Appeals majority perceived from the Supreme Court's decisions. (Section VII) It explains why the machine-or-transformation test is inconsistent with the Patent Act. It describes why the Supreme Court's decisions do not and should not require that test. The Court's decisions are described in section X. The paper describes an alternative to the Court of Appeals' test that is in tune with the Patent Act. (Section VIII) The Patent Act could be understood to limit patentable processes to those carried out by businesses and people when they make or when they use machines, manufactures, and compositions. The paper explains why limiting patentable process in this way would be likely to limit the costs patents impose on the economy. It describes why patentable processes could also be limited to processes of making or using some limited and identifiable group of machines, manufactures, or compositions. The purpose again would be to limit the costs of patents.

This paper briefly explains why there is no need for a separate rule against patenting methods of doing business. (Section IX) Any such rule is useless and has potential to do enormous harm. Finally, the paper describes the extent to which processes of making or using information of any kind should be patentable and the extent to which services should be patentable. (Sections XI and XII)

II. THE *BILSKI* ISSUE

In 1997, *Bilski* tried to patent a process for "managing the consumption risk costs of a commodity by a commodity provider."² *Bilski* said a commodity provider could manage risk by making a series of transactions with consumers at a fixed price based on historical average prices, identifying other "market participants" having a "counter-risk" position to those consumers, and making a series of transactions with those participants at a second fixed price to balance the "risk position" of the consumer transactions. As the Court of Appeals explained it, a commodity provider (such as a coal supplier) would bear less risk by agreeing to buy from commodity producers (such as coal mines) averse to the risk that prices will fall and sell to consumers (such as power plants) averse to the risk prices will rise. Assume this concept might

² This paper does not follow the custom of including citations to all the decisions mentioned, because modern information technology makes those decisions easily available to anyone, who cares to read them.

satisfy the conditions for a patent to issue. However difficult, assume it is possible that before 1997 no one in the United States bought and sold a commodity in these circumstances and that commodity dealers and traders learning of this concept in 1997 would have asked themselves “Why didn’t I think of that?”

The Court will decide Bilski’s fate because the Court of Appeals for the Federal Circuit said in his case that a process is a candidate for a patent only if (1) the process is tied to a particular machine or (2) the process transforms a particular article into a different state or thing. Three judges disagreed. The Court of Appeals said Bilski’s process could not be patented, because it does not use a machine and does not transform articles, it transforms legal obligations and these obligations are not physical objects or data representative of physical objects. The Court of Appeals also said, as it had earlier (*State Street Bank* (1998)), that the law did not separately forbid patents on methods of doing business. The Court of Appeals decision caused a furor over whether patents are available for processes that transform data, such as processes carried out by software, processes businesses carry out when providing services, and even processes of diagnosing and treating disease.

III. THE GENERAL LAW OF PATENTABLE SUBJECT MATTER

The issue is how the law defines the types of information that may be patented, what lawyers call patentable subject matter. The Patent Act says patents are available for “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.” The courts have generally said a “manufacture” is an article, some product made by a manufacturer. The Patent Act also says a process “includes a new use of a known process, machine, manufacture, composition of matter or material.” This means that some new process a producer or consumer carries out when using an old machine, article, or composition is patentable. If that true, a new use of a new machine, article, or composition is presumably also patentable. Another type of process is a process of making a machine, article, or composition. Manufacturing processes have long been regarded as patentable.

The Supreme Court says patents may not be granted for abstract ideas, abstract principles, laws of nature, natural phenomena, scientific truths, mathematical formulas and occasionally mental processes, even if new or newly discovered. The Court says patents may be granted for processes and products that apply natural laws, scientific truths or mathematical formulas. Abstract principles and ideas are always out of bounds.

Under current law, these two categories cover all possible things that someone may try to patent. Any new and useful process, machine, manufacture, or composition of matter may be patented and any abstract idea, abstract principle, law of nature, natural phenomenon, scientific truth, mathematical formula and perhaps mental process may not be patented. The law tries to assign everything anyone might try to patent into one category or the other. All of the judicial limitations on patents are implicitly viewed as interpretations of the meaning of the Patent Act. This means that, for example, a machine may be patented, while an abstract idea for a machine or an abstract principle on which a machine might be built and operate may not be patented. A process may be patented, while an abstract idea for a process or an abstract principle underlying a process may not be patented.

The judicial limitations are of three basic types. The first and earliest judicial limit is that abstract principles or ideas for products or processes are not patentable. The courts then said the mere results or effects obtained by some product or process are not patentable. This is simply another way of saying that abstract ideas for products may not be patented. One may not patent some category of products or processes by describing the general results obtained by using them. The second category of unpatentable information contains two somewhat similar types of information, natural laws and scientific truths. These two limits arose in the 1840s and 1850s. The courts say that while natural and scientific laws and principles may not be patented, products and process that apply laws and principles may be. The third limit is that naturally-occurring products or processes, sometimes called natural phenomena, not patentable. In the 1930s, the courts said naturally-occurring products or processes are not patentable. In the 1940s, the courts said manifestations or phenomena of nature are not patentable. This means that a naturally-occurring product or a process existing in nature may not be patented, even if not previously known.

The other judicial limits seem to be subcategories of abstract ideas, natural laws or natural phenomena. In the early 1970s, the courts said that mathematical formulas and algorithms may not be patented. One stated reason was that mathematical formulas and algorithms are mere ideas. Some lower federal courts have said methods of doing business could not be patented, because they are abstract ideas. However, it is far from clear that those courts intended to define an additional category of unpatentable subjects and the Court of Appeals for the Federal Circuit has rejected this additional limit.

IV. THE REASON FOR LIMITS ON PATENTS

The outer limits of patents should depend on why the limits exist. The question should be, “What benefit does patent law seek to achieve and what are the limits on patentable subjects needed to provide this benefit without causing greater harm?”

A. The Benefit of Patents

The Constitution gave Congress the power to enact patent laws “To promote the progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” The Constitution contains clues to the nature of patentable subject matter. The Constitution describes the purpose for granting patents and the rights patents provide. The purpose of granting temporary exclusive rights to inventors is that, without patents, inventors are likely to produce discoveries too slowly and the result is less progress. They will do so because they lack exclusive control of those discoveries. Without exclusive control, inventors may have little financial incentive to make discoveries. Exclusive rights are granted to increase those incentives.

The desired result of inventors producing more inventions earlier is greater “progress of Science and useful Arts.” Around the time the Constitution was written, an “art” was a particular type of business or trade that required special knowledge and the knowledge possessed by people working in a particular art was sometimes referred to as “science.” For example, Adam Smith in *The Wealth of Nation* (published in March 1776) described the benefits from the division of

labor and the value of exchanges between people specializing in different productive activities. Smith called these different activities different “arts.” Smith described how machines improved the productivity of labor and how the division of labor contributed to the process of inventing new and improved machines. Smith said the result of these inventions was more “science”, that is, information about improved machines.

The benefit of patents should be easy to define and the corresponding limits on subject matter set in a way to provide this benefit. The benefit is economic growth resulting from technological change. In 1981 (*Diamond v. Diehr*), the Court said patents are available for structures or processes which perform a function the patent laws were designed to protect. The Court has often said patents exist to improve incentives for research and development that yields new technical information. (*Dawson* (1980); *Kewanee* (1974); *Continental Paper Bag* (1908); *Seymore* (1871); *Wilson* (1846); *Grant* (1832)).

The Court said in 1974 (*Kewanee*) and again in 1980 (*Diamond v. Chakrabarty*) that patentable inventions are those permitting introduction of new products and processes of manufacture into the economy. New products increase demand and new manufacturing processes increase supply. The result is economic growth. New processes of using old products also contribute to economic growth. Consumers are producers of their own welfare. When consumers provide themselves greater satisfaction by using an old product in a new way, they produce an increase in economic welfare every bit as valuable as a new manufacturing process or a new product. For that reason, new processes of using products are also patentable, as the Patent Act says.

If the progress sought by the patent laws is economic progress through research and development that yields new technical information permitting the introduction of new products, new processes of manufacturing, and new processes of using products into the economy, this has a simple and important implication for patentable subject matter. Economic progress is the growth in the value of goods and services actually produced and supplied to United States consumers and businesses. For this reason, actual products and processes are patentable and abstract ideas, scientific principles and natural laws are not.

An abstract concept for some new type of product or process or an abstract idea for a new feature or capability of a product or process does not make a product or process available to producers or consumers. Producers and consumers are also not made one cent better off by a good idea for a new type of product or process. Likewise, producers and consumers are not able to satisfy any perceived needs by knowing about new laws of science and nature. Producers and consumers are not one cent better off merely because someone unearths a new principle underlying natural events or someone perceives some new principle of physics, chemistry, or biology, unless, as often occurs, the principle and some product or process people could use are one in the same.

B. The Benefits of a Patent on the Bilski Process

The Court could decide the Bilski process does not provide the type of benefit patent law seeks to achieve, because new trading strategies are not technical information, they are business

information. Technology defines the arrays of products available to companies to supply, processes, machinery and materials available to supply them, and uses to which those products may be put. Available technology limits the demand and supply of products. That is why we want better technology earlier. Mr. Bilski's process is not a new technological option with potential to increase the demand or supply of commodities. Mr. Bilski's process is a way for a business, given existing demand and supply of some commodity, to buy and sell with certain types of people at certain prices to reduce the risk the business takes. If the process works, this may reduce the effective cost of distribution by reducing risk distributors bear. However, any cost savings result from better business decisions by distributors, not a reduction in the cost of producing or delivering commodities.

However, assume Mr. Bilski provided a benefit of the type patent law seeks to achieve. The next question is whether the problem patent law seeks to solve is likely to arise for information about trading processes such as Bilski's. Is there is some reason to believe that, absent the prospect of patents, people or companies would invest too little time and money developing new commodity trading strategies? For purposes of this discussion, assume the answer is yes. Without patents for new strategies for buying and selling commodities, it is possible that commodity traders and people who think about new ways of trading might spend too little time and effort devising new ones. In other words, make the added assumption that the problem patent law tries to solve may exist for processes such as Bilski's.

Given these two assumptions, a patent on the Bilski process might provide a benefit. A benefit should not be enough. There is always an alternative to trying to solve some perceived problem with a law. It is to leave people alone and allow them to work out solutions. One time to leave people alone is when using a law to address a problem would cause so many other problems that citizens and consumers end up worse off. This could happen with patents.

C. The Costs of Patents

Patent law works by granting legal rights. Like all legal rights, patent rights create costs. When inventors obtain patents, other people bear four types of costs: costs to avoid violations; costs of errors; costs of legal uncertainty; and transaction costs of licensing.

When inventors obtain patents, other people must spend time and money to learn about the patents, understand the activities that would infringe the rights, take the steps needed to avoid infringement, gather information about prior art and analyze whether the rights were properly granted, and argue and litigate with patent owners about the scope or validity of the rights when there is uncertainty. Others bear the costs of errors when the Patent and Trademark Office grants and the courts enforce rights for inventions that are in fact old or obvious or issue and enforce rights against productive activities that did not use the invention that justified the patent. Others bear the costs of legal uncertainty that leads people not to engage in some productive activities because they are unable to decide with much confidence whether they would or would not violate valid rights. Legal uncertainty may remove products from the market even though, if they had been sold, the rights would have been found invalid or not to cover those products. Others bear costs in the process of obtaining and performing licenses (other than the payment to the patent owner). Producers and ultimately consumers bear all of these costs.

Patents on different types of subjects are likely to have different costs. The costs of using patents for any type of subject could be evaluated to set limits on patentable subject matter. The distinction between patentable products and processes and unpatentable abstract ideas, natural laws, scientific truths, and natural events are implicitly based on costs. The reason is that abstract ideas, natural laws and scientific truths may indirectly provide the benefit patent law seeks, and yet they are unpatentable. The most apparent reason is costs.

Newly known scientific or natural principles sometimes help people design actual products and processes and indirectly lead to economic growth. Knowledge of new principles and laws of nature may be valuable to engineers and applied scientists trying to design better products and processes for use by producers and consumers. New principles and laws may enable others to design enormously valuable products and processes. Without a patent, the first discoverer of a new scientific principle or natural law is highly unlikely to capture the value of the products and processes the principle or law indirectly made available. Patent rights could be granted to increase the value of new principles and laws to researchers who discover them in the same way that granting patents to new products and processes increases their value to those who create them.

The same things could be said about information for some general type of product consumers would like to have available or some feature that would make existing products more useful (the types of information the courts call an abstract principle) or some general result or effect consumers would like a product or process to provide. It takes time to think about new products and product features that might be useful and results or effects products might achieve. Many people spend considerable time and efforts to learn the types of products producers and consumers would like to have available and the results they are trying to accomplish. Someone had to realize it would help to have vehicles powered by engines rather than horses before that person or someone else figured out how actually to build and operate the automobile. Again, the first person to come up with an idea for a new or improved product may be unable to capture the value of that information without a patent. Since it is likely that people will invest too little time and effort trying to identify new types of products without the additional incentives provided by patents, the law might provide patents for abstract product ideas.

While there is this possible reason for permitting patents on abstract product ideas, scientific principles and natural laws, the law says they may not be patented. The most likely reason the law does not use patent rights to provide increased incentives to develop or find new principles and laws of science or to develop general concepts for new products is that, while there would be benefits, the costs and risks would be greater. The costs and risks of assigning patent rights, obeying rights, enforcing rights, and transacting business in patent rights to abstract scientific principles and natural laws would likely be much higher than the corresponding costs for actual products and processes made or used by producers and consumers. Similarly, the costs and risks people would bear in a patent system that attempted to protect abstract business ideas and concepts would be much higher than the costs of a system limiting rights to observable, identifiable things producers and consumers make, sell and use, and processes to make and use such things.

While there is another reason the law might prohibit patents on scientific principles and natural laws, the oldest judicial limit on patentable subject matter - abstract principles and ideas may not be patented – is probably based consideration of costs, errors, and uncertainty. Explicitly evaluating likely costs, errors, and uncertainty is the best way to attempt to decide how much abstraction is too much. This is the issue in *Bilski*.

D. The Costs of a Patent on the Bilski Process

Is Bilski's process for commodity trading a type of process for which patent rights may operate with low infringement avoidance costs, low error rates, low uncertainty, and low licensing transaction costs? I do not have the information needed to answer. I also suspect no one has provided this information to the Supreme Court, because legal standards do not clearly require it. My impression is that he should not, because the costs created by patents on processes such as Bilski's are highly likely to be greater than the benefits. These are some of the reasons.

Avoiding infringement is likely to be very expensive. If a patent is granted, the law puts the burden on commodity dealers and traders to learn about the patent, understand its scope, and respect the rights. There are many commodity dealers and traders doing large numbers of trades in an enormous variety of circumstances. It would be very expensive to train commodity dealers and traders to recognize when two series of trades involved the Bilski process. If commodity traders tried to avoid infringement, the added costs of commodity trading would likely be enormous. Even if traders learned what the patent defined as a series of infringing trades, there would seem to be almost no way for them to avoid infringement. To avoid a forbidden series of transactions, the trader must know the risk preferences or aversions of all of the people with whom they are dealing. There is no apparent way for commodity traders to know. This seeming difficulty in identifying when the process is happening may lead traders to avoid trades that might infringe, even though the trades did not involve the process if the circumstances of those trades were well understood. The patent may prevent transactions that did not use the Bilski process.

Errors in granting and enforcing rights are likely. There are two types of errors – patents mistakenly granted and enforced for old or obvious products or processes and patents mistakenly granted and enforced against products or processes that the information in a patent application did not make available.

If patents are granted on new commodity trading strategies, the patent system will provide sensible incentives to devise new ones, only if the Patent and Trademark Office and commodity traders and firms are able with little effort and high confidence to learn about all the old trading strategies used at any time in the United States. This is necessary to prevent old strategies from being patented. It is likely to be very difficult to determine whether any earlier trader bought and sold with people having opposite risk preferences in a series of transactions during some period of time. Therefore it seems highly likely that trading strategies practiced in the past would be successfully patented and the rights successfully enforced. Even if the Patent and Trademark Office and people affected by such a patent could learn the true state of the prior art, they would likely have difficulty determining whether some specific strategy would have been obvious to a skilled commodity trader. It seems highly unlikely there is anyone in the

Patent and Trademark Office who could make a well-informed judgment about whether some commodity trading strategy would have been obvious to any point in time.

The patent system also errors, when the scope of rights are so broad that they prohibit a producer or consumer from making or using some product or process and the description of the product or process in the patent application that justified granting a patent did not describe how to make or use that product or process. In other words, errors of scope occur when a patent prohibits a broader category of products or processes than those made available based on the information in the patent.

In the petition to the Supreme Court urging that they hear the case, Bilski's lawyers said that Bilski invented a process for buying and selling home heating oil or coal to reduce the risk a commodity provider will lose money, if future weather is colder or warmer than expected and resulting market prices are higher or lower than expected. Bilski apparently described a formula that a supplier of heating oil or coal could use to determine the price at which it should buy oil from oil and coal companies for supplying to customers using oil or coal to heat their homes in areas where weather changes in unforeseeable ways. Bilski's formula presumably was designed to allow oil and coal sellers to buy at prices that reflected the risk that weather would change, the effect of weather changes on oil and coal prices, and the way the suppliers from whom they bought view risk. The Bilski patent apparently contained separate claims to this invention. When Bilski's process is claimed in the manner addressed in the Court of Appeals' decision, it appears that Bilski is attempting to patent an abstract concept broader than the process he actually invented and described. This assumes, of course, that the Bilski formula is not generally applicable to all other types of unforeseeable events that cause changes in market prices.

Uncertainty about the scope of Bilski's rights is likely to be high. It is likely to be difficult for commodity dealers and traders to understand with any certainty the boundaries of Bilski's rights. Bilski said a commodity provider could manage risk by making a series of transactions with consumers at a fixed price based on historical average prices, identifying other "market participants" having a "counter-risk" position to those consumers, and making a series of transactions with those participants at a second fixed price to balance the "risk position" of the consumer transactions. It is likely to be difficult for a person to understand when two series of transactions have occurred in a way that carries out the process. Are they two series of transactions based on contracts made on the same day, the same week, or the same month? Are they two series of transactions in which the commodities are delivered on the same day, the same week or the same month? Are they two series of transactions in which the units of a commodity the provider purchases in one series of transactions are the same units sold in another series of transactions? What market participants have a counter-risk position to consumers? When is the fixed price to consumers sufficiently close to historical average prices to matter? When is the second fixed price such that it balances the risk position of the consumer transactions? For these reasons, the transactions covered by Bilski's claimed process are likely to be difficult to understand.

Licensing would likely impose large transaction costs. One way of avoiding infringement is for commodity traders to license. However licensing would seem to be difficult for the same reason that avoiding infringement would be difficult. Because it would be difficult for a trader to identify two series of transactions that involve the process, it would be difficult to

identify the transactions on which the patent owner should be paid. It would also likely be very difficult to determine the additional amount of money that a trader made as a result of carrying out a patented series of transactions compared to the next best series of transactions it could have carried out without infringement, the basis for determining a sensible price for a license. There are also many traders to license. It seems almost inconceivable that the patent owner could license each individual trader. Even if the patent owner licensed companies that employed many traders, the company would have the same difficulties.

For these and other reasons, the costs of patents on processes of this type would likely swamp the gains from more and better R&D on trading processes and cause economic contraction, not economic growth. If that is correct, Mr. Bilski should not have patent.

E. When Benefits and Costs Are Difficult to Assess

I said the question should be, “What benefit does patent law seek to achieve and what are the limits on patentable subjects needed to provide this benefit without causing greater harm?” What is the correct legal result when it is difficult, as it will often be, to make a judgment about the relative size of benefits and costs?

When in doubt, increased incentives to produce new technology should always be favored. History has shown the new technology is the main path to prosperity and patent law is the one law to encourage development of new technology based on millions of self-interested market judgments. For that reason, when it is unclear whether the costs will exceed the benefits, the subject matter rules should not be invoked to prevent a patent. Patents should be refused only when the costs are highly likely, if not virtually certain, to exceed the benefits.

Patent law also has built in safeguards to limit the costs, when the subject matter rules include too much. The Patent Act requires that an inventor describe in an application the manner of making and using an invention. If an inventor merely has an abstract idea for a product or process and has not designed a specific product or process that someone could make or use, the Patent and Trademark Office should not grant a patent, because the application fails to describe how to make and use the invention. The courts should find such a patent invalid, if the office does. If the application describes a specific product or process someone could make and use, and the claims are too broad or too vague, the Patent and Trademark Office should again not grant them and the courts should find them invalid. If some invention would likely have become available without patent incentives, the nonobviousness requirement should prevent a patent. These and other rules should operate to limit some of the costs of patents.

V. IF BILSKI’S PROCESS IS PATENTABLE, WHAT PROCESSES ARE NOT PATENTABLE?

What about processes other than Bilski’s? The Bilski process involved a way of buying and selling commodities with the right people at the right prices. If the Bilski process is patentable, patents are presumably available to business people who think up new ways to figure out what products consumers will want in the future, the prices at which to sell those products, the terms for financing purchases, whether to lease or sell or do both, the quantity to produce

during any given period, the quantity to maintain in inventory or whether to have inventory, the best ways to advertise and market, the training and support to provide customers, and on and on and on. If patents are granted on processes businesses use to make these decisions and act on them, I would expect the benefits, if any, to small and the costs very large for the same reasons. If that is correct and these processes are nonetheless patentable, patent law will work to impede economic growth and provide yet another example of a law having the opposite of its intended effect.

Indeed, if the Bilski process is patentable, so presumably are new processes Congress could use identify and enact better laws, government agencies could use to identify and adopt better regulations, courts could use to identify and make better decisions, the Fed could use ... and on and on. If Bilski's process is patentable, I may seek a patent. I have developed a process to help companies involved in patent disputes and litigation to make economically sensible decisions whether to settle and, if so, on what terms and for what price. If Bilski may have a patent, why not me?

This is presumably why the Court asked Bilski's counsel whether processes such as training horses and teaching antitrust law could be patented. There must be some limits and Bilski's counsel seemed to suggest there were none.

VI. THE SOMETIMES MEANINGLESS DISTINCTION BETWEEN PRODUCT AND PROCESS CLAIMS

Most, if not all, processes of economic value are carried out with machines, manufactures, and compositions. Consider only machines and processes of using machines. Most, if not all, new processes may be claimed as a machine or group of machines that perform the steps of the process. Most, if not all, new machines or groups of machines may be claimed as a process having the steps carried out when the machines operate.

The possibility of describing the same thing in two ways requires that sensible limits on patentable processes may not be avoided by simply claiming a process as a machine or group of machines that carry out the process steps. The same considerations that should guide what processes are patentable should also guide what machines are patentable. See Section VIII. If those considerations would render a process unpatentable, a claim that merely describes a machine or group of machines by the process they carry out should also be unpatentable. The law has a special provision to prevent this result. Claims governed by the sixth paragraph of section 112 permit a part of a "combination" machine to be claimed by a specified function, because such a claim is limited to what the part is in addition to what it does. In that way, such claims define some limited and identifiable group of machines.

This is why several Justices on the Court were perfectly right to ask why a process that is not patentable should become patentable merely by changing the claim to say some steps of the process are carried out using some multiple-use machine or changing the claim to say the invention is some multiple-use machine or group of machines that carries out the steps of the process. For example, a commodity trader or dealer would probably use a telephone and a computer to carrying out a series of transactions. If the Bilski process is not patentable because

of high costs, the process should remain unpatentable, even if the process is limited to transactions carried out using a telephone and a computer. Use of a telephone or computer will not reduce any of the costs that make the process unpatentable. Likewise, if the Bilski process is not patentable because of high costs, Bilski should not be able to avoid the effect of that conclusion merely by claiming the process as a telephone system or computer system that carries out all or some steps of the process.

However, if Mr. Bilski developed software specifically designed to allow dealers and traders to collect and process the information needed to identify the required two series of transactions the claim describes (meaning to determine for a specific commodity the companies from whom to buy and sell during some period of time in some market and the prices at which to buy and sell given different views of risk) and perhaps even execute those transactions, I would be likely to view this as patentable subject matter. The value of the software is the same as the value of the process, people who use the software will know they are using the process, there are a limited number of software suppliers, and people should be able to learn whether there was earlier software to do the same process. This would leave to the nonobviousness requirement the determination whether the new strategy and software used to implement it, if new, would not have been recognized and relatively cheaply developed in 1997 and the requirement for particular and distinct claims to prevent scope errors and too much uncertainty. These same considerations are why I believe the Court of Appeals in *State Street Bank* properly found the system involved in that case patentable.

VII. THE *BILSKI* MACHINE OR TRANSFORMATION LIMIT ON PATENTABLE PROCESSES

The Court of Appeals thought there was a need for a better legal standard defining patentable processes. The Court of Appeals thought something more was needed than the current distinction between patentable processes and either unpatentable abstract ideas for processes or unpatentable natural laws or natural phenomena that might be employed in a process. The Court of Appeals implicitly thought it inadequate to assess process-by-process the nature of the benefits and the likely costs of a patent on some claimed process.

The Court of Appeals said a process is a candidate for a patent only if (1) the process is tied to a particular machine or (2) the process transforms a particular article into a different state or thing. The Court of Appeals' test should not stand for the simple reason that it is inconsistent with the Patent Act. The Patent Act defines a "process" to mean "process, art, or method, and includes a new use of a known process, machine, manufacture, composition of matter or material." Under the Court of Appeals' test, a process of using a machine is patentable. Since the Court of Appeals says this is the sole test for patentable subject matter, this means a process of using a manufacture, composition or material is not patentable. The problem is that the Patent Act says that these processes are patentable, when the process is new and the manufacture, composition or material is "known", presumably meaning old. If as the Patent Act says, a new process of using an old manufacture, composition or material is patentable, surely a new process of using a new manufacture, composition or material is also patentable.

The Court of Appeals said the *Bilski* limits were based on the Supreme Court's decisions. The Court of Appeals called this the Supreme Court's "machine-or-transformation test." The Supreme Court has never said the only types of patentable process were (1) a process tied to a particular machine or (2) a process that transforms a particular article into a different state or thing. If the Court had said so, there would be no controversy – what the Supreme Court says is law is law, until the Court or Congress says it is not the law.

The Supreme Court has never said that patentable processes were those tied in some sense to a machine. Indeed, the main concern of the Supreme Court on the relationship of machines and process patents has been to prevent an inventor of a machine from claiming a process that may be carried out using the inventor's new machine as well as all other machines that perform the same operations. See Section X. When the Court thought an inventor of a new machine was trying to patent a process as a way to effectively patent all machines that perform the same operations, the Court said the inventor could not have a process patent. See *Risdon Locomotive Works v. Medalf* (1895); *Corning v. Burden* (1853). When the Court thought an inventor had devised a new process that did not depend on use of a certain type of new machine, the Court said the inventor could have a process patent. See *Smith v. Snow*; *Waxham v. Smith* (1935); *The Telephone Cases* (1888) (approving a claim to both a machine and a process); *Tilghman v. Proctor* (1881); *Cochrane v. Deener* (1877). In short, when a process was "tied to" a machine in the sense that a particular machine was needed to carry out the process, the Supreme Court said the process was not patentable. This makes no sense, because it makes no difference whether an inventor of a new machine patents the machine or a process of using the new machine. However, this distinction lives in the Court's decisions and the Court of Appeals test is inconsistent with it.

The Supreme Court also never said that patentable processes were those that transform a particular article into a different state or thing. The Supreme Court used those words in *Diamond v. Diehr* to explain why a person who designed a process of making products from rubber was not trying to obtain a patent on a mathematical formula describing how long it would take rubber to cure given the temperature of the rubber. The Court said, "On the other hand, when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect (*e. g.*, transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101." Obviously, when the Court says an example of a patentable process is one that converts an article into a given state or thing, the Court is not saying that no other types of processes may be patented. The attorney for the government defending the Court of Appeals' test came up with an ingenious argument. It was that the Court meant a process is patentable only if it transforms an article or is tied to a machine. This makes sense only if the other conceivable patentable process is one carried out with a machine. However, there are many others. The Patent Act itself says a process carried out with an article (a "manufacture") and a process carried out with a composition are also patentable. There are also many processes useful to make products other than to transform some article into a different, modified article. New production processes may involve assembling old parts in a better or cheaper way and without changing the parts in any way, as Henry Ford did with his famous assembly line.

Aside from what the Supreme Court has not said and ignoring the Court's decisions on the relation between machines and processes, the Court of Appeals' standard is a fair characterization of the results in the Court's decisions, if you are willing to say a process for hatching chicken eggs is a process that transforms one article (an egg) into another article (a baby chick) and a process for sending the sound of a person's voice from one place to another is a process of transforming one article (a person's voice spoken in one place) into a different article (that person's voice in another place). See *Smith v. Snow*; *Waxham v. Smith* (1935) and *The Telephone Cases* (1888). However, this does not require the Court of Appeals' test, because the results in the Court's decisions are necessarily limited by the types of processes and products presented to it for decision and these constitute an infinitesimally tiny fraction of total past processes and products and no fraction of future processes and products (the only ones that matter).

Even if the Court of Appeals test precisely captured the results in the Court's past decisions, the test would be desirable only if the Court's past decisions reflect a clear, consistent, desirable policy. They do not. The Court of Appeals found the "machine-or-transformation test" in the Court's decisions in *Gottschalk v. Benson*, *Diehr*, *Parker v. Flook*, and *Cochrane*. The Court of Appeals also said this test was consistent with the Supreme Court's decisions in *Tilghman* and *O'Reilly v. Morse*. One of the problems with basing the law on these decisions is that the law found in *Gottschalk v. Benson* and *Parker v. Flook* is not clear and the results in those cases are highly questionable and probably undesirable for a well-functioning patent system. Section X provides a brief history of most of the Court's decisions that relate in some way to the patentability of processes. I omit the decisions in *Funk Brothers* (1948) and *Diamond v. Chakrabarty* (1980).

VIII. AN ALTERNATIVE TO THE *BILSKI* LIMITS ON PATENTABLE PROCESSES

The Supreme Court is likely to decide that no new legal formula is necessary or desirable. However, if a new formula is needed, the Patent Act suggests a simple one. The Patent Act authorizes patents for machines, manufactures (that is products made by manufacturers) and compositions. Call these "products." Products are patentable because the costs and risks of designing new and better products may be large and, without patents, too few new product designs will be developed too slowly. Patents will result in more designs for new and better products being available earlier. Products are also patentable, because patent rights may be assigned to products with relatively low cost of avoiding infringement, low rates of error, little uncertainty about the scope and validity of such patents, and low costs of transactions in rights.

While I do not propose that the law do so for reasons mentioned below, the nature of patentable processes could be limited in the same way. Patentable processes are not any series of steps carried out when engaging in any activity from walking the dog to doing open heart surgery. The Patent Act suggests that patentable processes are the steps carried out by businesses and people when they make or when they use machines, manufactures, and compositions. There are many indications in the Patent Act that patents should be limited in this way. One is the definition of "process" that "includes a new use of a known process, machine, manufacture, composition of matter or material." The Act presumably took for granted that a process of making these products was patentable. Other indications are the information a patent

application must contain, the requirements for claims, the way prior art is defined, the way rights may be lost, the way priority of invention is determined, and the acts that constitute infringement. If patents are not limited to those two types of processes, there are no other apparent limit on patentable processes in the Act.

If the Patent Act is understood in that way, the Court of Appeals was somewhat right and somewhat wrong. The court was right to say that a process tied to a machine (meaning presumably a process carried out using a machine) or a process of transforming an article into a different state or thing was patentable. The court was wrong to say patents are limited to those processes, because this means a process of using a manufacture or composition is not patentable (when the Patent Act itself says that it is) and a process of making a machine, manufacture, or composition is not patentable unless it involves transforming an article (when there are clearly other steps involved in making such products).

What would be accomplished by limiting patentable processes in this way? The answer is to limit costs.

When processes involve making products, the costs of learning about and avoiding infringement are lower because there are usually a limited number of makers of products and they need learn about the patent only if they are making the type of product the process produces. They may avoid infringement by setting up the production process once to make the product in a noninfringing way. Errors on validity are less likely because it likely to be easier to identify old processes of making products – people keep records of how they made products. Errors on scope are less likely because it likely to be easier to compare some production or use process to one described in patent claims. Legal uncertainty is less a problem because the process will necessarily involve steps that produce a product and those steps are capable of being defined by reference to how they lead to the product. Costs of licensing are low because there are a limited number of makers of products and hence licensees.

Processes of using products have the same characteristics. Producers usually know what people will do with their products and if some use is infringement, the producer may disable use in that way or advise its customers not to use in the infringing way. Errors are less likely. There are likely to be records of the ways earlier products were used. The uses of some product are limited and a claim should permit people to easily identify prohibited uses. Legal uncertainty should be lower because the claim describes the forbidden process by reference to the product used. Costs of licensing are low because again there are a limited number of licensees, the sellers of the product.

However, one fact that leads to most of these conclusions is that for any process of making or using products, there must be a limited number of types of products made and used. If that is not true, these limits on cost, errors, uncertainty and transactions will not be achieved.

A process of making products that is so general as to apply to all products will not have low infringement avoidance costs, error costs, uncertainty costs and low licensing costs. For example, a process of making products by arranging for materials and parts to arrive at the plant at just the right time would apply to every product. A process of making products only when

they have been sold and may be immediately shipped would apply to all products. A process of selling products at the most profitable price or prices would apply to all products. Processes this broad are presumably not patentable because they apply to every producer of every product. The costs of patents will be enormous.

A process of using products may also be so general as to generate enormous costs. For example, suppose a process of buying and selling products in two series of transactions, such as *Bilski's*, was described in a patent claim and the claim, unlike *Bilski's*, also required using a telephone or a computer or the internet to carry out some of the steps needed to negotiate and complete the transactions. This alone should not make the process patentable. The reason is that the telephone, the computer and the internet have millions and millions of uses other than to carry out this process. Simply because the process requires use of one of these products will not help people avoid infringement, make it less likely that there will be errors in granting rights, reduce the uncertainty people face when trying to determine what activities the patent prohibits, or reduce the costs of licensing.

The patent will provide no incentives for companies selling telephones or computers or providing telephone or internet service to prevent infringement or license, because the availability of the patented process does not make those products or services one cent more valuable to customers. Even if it did, there is no apparent way for those companies to prevent infringement or license in a way that would provide the patent owner a return in proportion to the use of the process. Everyone who uses one of these devices or services will be on their own in dealing with the patent rights. Too many people would have to avoid infringement or be licensed. Requiring that the process be carried out in these ways does not make it more likely that the patent office and other people will be able to learn whether the process had been used previously or help people identify when an infringing series of transactions is occurring. In short, limiting the process to transactions made using a telephone or a computer or the internet reduces none of the costs that make the process unpatentable, when not limited in these ways.

If the Patent Act were interpreted as limiting processes to those carried out in making or using machines, manufactures, or compositions, an added limitation might be desirable. Patentable processes are processes to make or use some limited and identifiable group of machines, manufactures, or compositions. Processes to make or use all machines, manufactures, or compositions likely to be produced by all suppliers may not be patented. Processes to make or use one specific machine, manufacture, or composition whose production cost or value to users depends significantly on the process may be patented. The difficult issue is, as always, those in the middle. For the middle, there is no better answer than to make the best possible assessment of whether the expected costs of patents on some type of process are highly likely to be greater than the benefits of more and earlier processes of that type.

I said the Patent Act might be interpreted to limit patentable processes to those involving making or using machines, manufactures, or compositions. The purpose of that limitation would be to limit patents to processes involving low patent costs. What would be the risk of limiting patentable processes in this way?

One is that someone might design a new process that does not involve making or using a machine, manufacture, or composition, has potential to contribute to economic growth, and for which a patent may be granted at low cost. While I have a difficult time thinking of how that might happen, my experience and imagination (or better possible lack of experience or imagination) should not constrain the patent system.

Another is that the law might develop to limit patentable processes to making or using patentable machines, manufactures, or compositions. Since patentable machines, manufactures, or compositions are not all machines, manufactures, or compositions, the nature of patentable processes would be unnecessarily limited. For example, *American Fruit Growers* (1931) declared unpatentable a claim to fresh fruit treated with borax to make the fruit resistant to blue mold rot and a process of treating fruit with borax. Fruit treated with borax was not patentable even though having borax in the rind made 30 to 40 percent more fruit available to consumers. That enormously counterproductive result would be compounded if it caused the courts to the apparently logical conclusion that a process for making such fruit must also be unpatentable.

A third is that the law might develop to limit an inventor to machine or process claims, and not both types. An inventor of a machine and a process of using it should have both. This enables patent owners to exploit their inventions more efficiently by licensing machine makers to make and sell machines and machine users to use machines. Process claims are necessary for patent owner to defeat the unnecessary limits on exploiting inventions imposed by the courts.³

IX. A BUSINESS METHOD LIMIT ON SUBJECT MATTER

Bilski is often said to involve whether business methods are patentable and whether the Court of Appeals' decision in *State Street Bank* should be changed. There is nothing about *Bilski* that requires the Court to decide whether methods of doing business are patentable.

Since the early 1900s, the courts have sometimes suggested that financial and accounting systems and processes employed by businesses to record and keep track of financial and other business data were not patentable.⁴ In that context, the courts sometimes said a system of transacting business disconnected from the means for carrying out the system is not an "art" and therefore not patentable. Typically, the courts in such cases said the inventions were not patentable because they lacked novelty or invention, the predecessor requirement to

³ See, John W. Schlicher, The New Patent Exhaustion Doctrine of *Quanta v. LG* - What It Means for Patent Owners, Licensees and Product Customers, 90 *Journal of the Patent and Trademark Office Society* 758 (2008).

⁴ E.g., *Hotel Security Checking Co. v. Lorraine Co.*, 160 F. 467, 468-69 (2d Cir. 1908). See also, *Ex Parte Murray*, 9 USPQ2d 1891 (Board of Patent Appeals and Interferences 1988).

nonobviousness.⁵ This rule was not confined to patents related to finance and accounting and was applied, for example, in actions involving patents for a system for fighting fires and a drive-in theater.⁶ In those cases, the courts said a system for transacting business was not patentable subject matter and a means for carrying out a system for transacting business was patentable. Again, those courts found the inventions unpatentable for lack of invention.⁷ However the concept that a process that was a mere method of doing business was not patentable subject matter was not universally recognized or applied. In 1983, a district court found patentable subject matter in a claim to a system for use by a stock brokerage firm to manage the cash in the account of a client having a general brokerage account for buying and selling securities and a credit card account with a bank providing credit card services.⁸

In the 1990s, the Court of Appeals for the Federal Circuit said that there was no separate doctrine that methods of doing business were not patentable subject matter. Judge Newman explained in her dissenting opinion in *In re Schrader* (1994) that the law has never defined patentable subject matter based on whether a process was directed to a method of doing business.⁹ She observed that decisions that might be read to contain such a rule were decided on the basis that a claimed processes was not novel or lacked invention. *State Street Bank* (1998) is important only because the Court of Appeals, in an opinion by Judge Rich, agreed.¹⁰ There is no reason for the Court to revisit *State Street Bank* on that issue. In *Bilski*, the Court of Appeals said the same thing.¹¹ The court said that the only limitations on patentable subject matter were that abstract ideas, laws of nature, and natural phenomena were not patentable. When *State Street Bank* and then *Bilski* said there was no separate rule that methods of doing business were not patentable, the Court of Appeals was not saying or implying that all methods of doing business are patentable. After those decisions, a claim to an abstract idea or principle for

⁵ *In re Wait*, 73 F.2d 982, 982-983 (C.C.P.A. 1934); *Hotel Security Checking Co. v. Lorraine Co.*, 160 F. 467, 472 (2d Cir. 1908).

⁶ *Loew's Drive-In Theatres v. Park-In Theatres*, 174 F.2d 547, 551-552(1st Cir. 1949); *In re Patton*, 127 F.2d 324, 325, 327-328 (C.C.P.A. 1942).

⁷ *In re Patton*, 127 F.2d 324, 325 (C.C.P.A. 1942).

⁸ *Paine, Webber, Jackson & Curtis, Inc. v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, 564 F.Supp. 1358, 1364, 1365-69 (D.Del. 1983).

⁹ *In re Schrader*, 22 F.3d 290, 298 (Fed.Cir. 1994)(Newman, J., dissenting).

¹⁰ *State Street Bank & Trust Co. v. Signature Financial Group, Inc* 149 F.3d 1368, 1375-76 (Fed.Cir. 1998).

¹¹ *In re Bilski*, 545 F.3d 943, 964-966 (Fed.Cir. 2008).

conducting a business is not patentable, because an abstract idea or principle of any kind is not patentable.

A moment's thought reveals that a legal standard that methods of conducting business are unpatentable is at once meaningless and capable of doing enormous harm. The entire patent system is directed to products and processes used by businesses in the United States. If a process is not patentable because it is conducted by a business, almost no processes are patentable. The only patentable processes are those carried out by a company when it is not conducting its business, something a company presumably never does. For example, if a company is in the business of making and selling automobiles, a faster, cheaper production process (like Henry Ford's assembly line) is a method carried out by the company when it conducts its automobile business.

The only awkward issue involving methods of doing business was the unfortunate amendment to the Patent Act in 1999 establishing the so-called prior user defense in section 273. Establishing a prior user defense as part of the United States patent system was a mistake and was recognized as such by many people at the time. The reason the Patent Act refers to a "method of doing or conducting business" in that amendment is that it allowed Congress to avoid making a decision that devalued all United States patents by applying the devaluation only to a disfavored category of patents, namely patents obliquely referred to by business people and lawyers, and ultimately by the statute as "methods of doing or conducting business." When Congress said in that the prior user defense applied only to methods of doing business, Congress was not attempting to change the limits on patentable subject matter.

X. THE SUPREME COURT'S DECISIONS ON PATENTABLE SUBJECT MATTER

The Supreme Court has described unpatentable subjects in many ways. The oldest is that abstract principles and ideas may not be patented. The Court applied that rule to prevent an inventor from obtaining a patent granting rights broader than those needed for a patent system to function properly, that is provide the desired benefits without doing greater harm. The Court usually applied the rule to prevent what I earlier called scope errors. If a claim in a patent would give some inventor the right to prevent others from using the machines or processes the inventor designed and made available through the information in the patent application and also other machines and processes, the Court said the claim was improper. The logic is the same whether the law says the claim is too abstract or too broad. If someone attempting to identify the Supreme Court says, "It is a court," the description fails because it is abstract and broad. The Court also often applied this rule in cases where the Court had a hard time understanding what a claim meant. The Court applied the rule against abstractions to prevent what I earlier called uncertainty errors. In short, the Court used the rule against patents on abstractions to avoid the costs, errors and uncertainty a patent would impose on others and on the economy.

The venerable Joseph Story articulated the rule against patents on abstract principles in 1840 (*Wyeth v. Stone*), while riding circuit. Nathaniel Wyeth designed two horse-drawn machines for cutting ice out of frozen lakes or ponds into a size suitable for use in ice boxes. He said:

“It is claimed, as new, to cut ice of a uniform size, by means of an apparatus worked by any power other than human. The invention of this art, as well as the particular method of application of the principle, is claimed.”

Justice Story said Wyeth could have a patent on the two horse-drawn machines he designed and described, and not on the abstract principle of ice cutting with machines not powered by humans. The abstract principle was are not patentable, because that patent would give Wyeth the right to prevent others from making ice-cutting machines other than the two machines Wyeth invented and described. Justice Story would have had no objection the Wyeth patenting a process of using the two machine he designed.

Justice Story said he was unclear what the claim meant. Was it the two machines used together? Was it the machines separately? Was it for “any mode whatsoever of cutting ice by an apparatus, worked by power, not human, in the abstract, whatever it may be?” Justice Story said that, if Wyeth claimed all machines for cutting ice not powered by humans, the patent was void, “as it is for an abstract principle, and broader than the invention, which is only cutting ice by one particular mode, or by a particular apparatus or machinery.” Justice Story found the claim to assert such abstract and broad rights that the claim was void. Justice Story’s explained why the claim was void in two ways.

One explanation was that the claim was “for an art or principle in the abstract, and not for any particular method or machinery by which ice is to be cut.” The abstract art or principle was cutting ice with machines not powered by humans and not to a particular machine that cut ice in that way. Justice Story’s insistence that a patent be limited to a particular machine was entirely consistent with the Patent Act’s limit on patents to “any new and useful art, machine, manufacture, or composition of matter.” There is an important difference between a machine that someone may build and use and an idea for something it would be nice for a machine to do. The real machine actually helps people do things. The idea for a machine does nothing for them.

Justice Story other explanation was that the inventor could not have a patent on all machines and methods for cutting ice, because no person could possibly invent all ways of cutting ice. He said a claim broader than an inventor’s actual invention was void. The claim to all machines that cut ice without human power was broader than Wyeth’s invention, the cutter and saw machines described in the patent.

Given the situation facing Justice Story, it is far from clear that Justice Story was stating two separate reasons why the claim could not stand. The Wyeth patent described the structure and operation of the horse-driven cutter machine and the horse-driven saw machine. Since the patent described only those two machines, Justice Story said Wyeth could not have a claim that covered all machines for cutting ice using any source of power other than a human being. The logic is the same whether you say the claim was void because it was directed to the abstract principle of non-human powered ice cutting machines rather than a particular ice cutting machine or because the claim to all non-human ice cutting machines was broader than the two machines Wyeth invented and described in the patent. Said either way, the concept is that claims must be limited to particular machines described in a patent application and not merely “limited”

to an abstract category of machines defined only by some general function (“cut ice of a uniform size”) and general characteristic (“worked by any power other than human”). Patents are granted to those who design and describe particular machines someone may build and use based on the information in the patent and not to those who merely think of and describe some general function for machines to perform or some general feature to possess and leave it to others to figure out some way to build and use a real machine.

It is plain from Justice Story’s discussion of the breadth and the abstractness of the claim that he believed the claim would impose costs on others the patent system could not tolerate. Ice-cutting machines that use the principle and not the two machine designs may be found to infringe, even though the information in Wyeth’s patent application provides no help in designing those machines. The designers of those machines must bear the same design cost and risks as Wyeth, when he designed his two machines. If those machines infringe, other bear the cost of their unavailability. If it is difficult to say what other machines infringe due the abstractness of the claim, the scope of rights would be unclear and that uncertainty would likely prevent machines from being designed and sold that use neither of the two Wyeth designs, another cost others will bear.

The Court adopted and applied the *Wyeth v. Stone* rule against patents on abstract principles in 1852 (*Le Roy*) and again in 1853 (*O’Reilly*).

In 1852 (*Le Roy v. Tatham*), the inventor described a machine having parts called the core and bridge (or guide-piece), the cylinder, the piston, the chamber and the die for applying heat and pressure to two surfaces of an extruded piece of lead to form lead pipe by bonding the two surfaces together. The inventor claimed the machine. “What we claim as our invention, and desire to secure by letters-patent, is, the combination of the following parts above described, to wit, the core and bridge or guide-piece, the chamber, and the die, when used to form pipes of metal, under heat and pressure, in the manner set forth, or in any other manner substantially the same.” The Court said this claim was invalid.

The Court said the machine was old, because the limitation specifying one use of the machine (“when used to form pipes of metal, under heat and pressure”) could not make an old machine new. There was an old machine designed to make lead pipe from hot solid lead by extruding the lead into a die. The trial judge told the jury that in considering whether the inventor’s machine was new, they could consider whether the machine used “a principle, newly discovered, producing a new and useful result.” The Court said the trial judge erred by instructing the jury that it could find the machine new because it employed a newly discovered principle that two pieces of lead could be bonded by use of heat and pressure and achieved a new result, lead pipe made in that way. In the course of explaining why an old machine was not new merely because it was used in a way that employed a new principle to obtain a new result, the Court said principles in the abstract could not be patented, the powers by which machines operate could not be patented, and the effects or results produced by machine could not be patented. What could be patented was the design of a new machine.

The Court said the discovery that some property of lead permitted two pieces of lead to be combined under heat and pressure could have been patented if the discovery was applied to

produce a useful article, such as pipe, and the specific process of making pipe was described, such as the temperatures and pressures required. The Court said that the case did not involve this issue because the inventors did not attempt to claim a new process of making lead pipe. The Court said the inventors claimed only a machine for making lead pipe. Since the inventors attempted to patent a machine, the machine must be new.

Three Justices dissented, because they believed the inventor had modified the old machine based on the discovery that extreme pressure and heat permitted joining two pieces of lead so that the claimed machine was new.

The Court in *Le Roy* might have said we are unable to tell what is being patented and others are likely to have the same problem. The majority believed the machine was old. The old machine may be used in a new way (to make lead pipe by taking a long flat piece of lead, bending it so that two edges touch, applying high pressure to force the edges together and heating the edges). The claim is to a machine when used in the new way. What is the effect of such a claim? Does the patent claim a machine or a process or, as it says, a machine when being used in a process? If the claim is to a machine, the law says it is infringement to sell or use the machine. If it is infringement to sell an old machine, this is undesirable because the patent will permit the inventor to capture the value of the machine in other old uses and perhaps other future uses. If the claim is to a process, the law says it is infringement to use the process. Users of machines infringe when they carry out the process. If the claim is to a machine when being used in a process, what is infringement – when someone sells a machine or when someone uses a machine? It is difficult to say and the result may be to deter sales of old machines, even to those intending to make only old uses. Because the claim is prone to errors and uncertainty, it is not patentable. Based on the opinion, the Court would also likely have had no objection to a patent on a process of making lead pipe using the old machine to carry out the necessary steps of applying pressure and heat.

In 1854 (*O'Reilly v. Morse*), the Court found claim 8 of Samuel Morse's patent on the telegraph invalid. Three dissenting Justices would have found it valid. At the time Morse made his invention, electricity was known and it was known that there was some relationship between electricity and magnetism. However, prior to Morse, scientists had been unable to use the ability to convey electricity through a circuit to communicate information over long distances, principally because the current decreased to a low level over a short distance. Morse devised a system that permitted characters to be transmitted over a circuit by using electromagnets to make marks on paper and by increasing the voltage of the magnet at the point of recording. His patent described the circuits, batteries, receiving magnets, power sources, electromagnets, levers, and points for recording dots and lines corresponding to an alphabet between sending and receiving stations. Morse's eighth claim read:

I do not propose to limit myself to the specific machinery or parts of machinery described in the foregoing specification and claims; the essence of my invention being the use of the motive power of the electric or galvanic current, which I call electromagnetism, however developed, for marking or printing intelligible characters, signs or letters, at any distances, being a new application of that

power of which I claim to be the first inventor or discoverer.

The Court said claim 8 would give Morse the exclusive right to every improvement that might be devised employing electromagnetism to mark or print characters at a distance. The Court said in the future some person might discover a way of using electromagnetism to print at a distance “without using any part of the process or combination set forth in [Morse’s] specification.” The Court said claim 8 was too broad, because Morse claimed an exclusive right to use “a manner and process which he has not described and indeed has not invented, and therefore, could not describe when he obtained his patent.” The Court said that Morse discovered a method of using electromagnetism to print intelligible signs at a distance that could be achieved only using the machinery and mechanical contrivances that Morse devised. For that particular method and machinery, he could obtain a claim. He could not claim more. The Court concluded that the claim embodied a scope error. Three dissenting Justices reached the opposite result. They found it implicit in the patentability of an “art” that rights to inventions carried out through machinery are not necessarily limited to use of the particular machinery disclosed.

In 1853 (*Corning v. Burden*), the Court said that Henry Burden could not claim a process if the steps of the process were the “function or abstract effect” of a machine. Henry Burden invented a way to improve making iron in a malleable form. Burden described a machine for rolling cast iron in a form called “puddler’s balls” into a malleable iron called “blooms” by rotating the balls between converging surfaces under continuous pressure. His patent described his invention as a “machine.” He claimed his invention in part in these words:

The patentee’s summary is as follows: “Having thus fully made known the nature of my said improvement, and explained and exemplified the manner in which I construct the machinery for carrying the same into operation, what I claim as constituting my invention . . . is the preparing of the puddlers’ balls as they are delivered from the puddling furnace . . . by causing them to pass between a revolving cylinder and a curved segmented trough adapted thereto, constructed and operating substantially in the manner of that herein described and represented in figures 2 and 3, of the accompanying drawings”

The trial court instructed the jury that the patent covered a process and the process claim could be infringed by using a machine different from that described by Burden. The Supreme Court said this was error. The Court said the Act permitted someone to patent an “art” and an “art” could be a certain type of process. The types of processes that could be patented were those that produce a result or effect by chemical action, by the operation of some element or power of nature or by the action of one substance on another:

One may discover a new and useful improvement in the process of tanning, dyeing, etc., irrespective of any particular form of machinery or mechanical device. And another may invent a labor-saving machine by which this operation or process may be performed, and each may be entitled to his patent. As, for

instance, A has discovered that by exposing India rubber to a certain degree of heat, in mixture or connection with certain metallic salts, he can produce a valuable product, or manufacture; he is entitled to a patent for his discovery, as a process or improvement in the art, irrespective of any machine or mechanical device. B, on the contrary, may invent a new furnace or stove, or steam apparatus, by which this process may be carried on with much saving of labor, and expense of fuel; and he will be entitled to a patent to his machine, as an improvement in the art. Yet A could not have a patent for a machine, or B for a process; but each would have a patent for the means or method of producing a certain result, or effect, and not for the result or effect produced. It is for the discovery or invention of some practicable method or means of producing a beneficial result or effect, that a patent is granted, and not for the result or effect itself. It is when the term process is used to represent the means or method of producing a result that it is patentable, and it will include all methods or means which are not effected by mechanism or mechanical combinations.

What did this definition of a patentable process exclude? The Court said it excluded processes that were the abstract effects or the function of a machine. "But it is well settled that a man cannot have a patent for the function or abstract effect of a machine, but only for the machine which produces it." In other words, if a machine was involved in combining the materials or changing them, only the machine could be patented. The patent could only be infringed by the use of a similar machine.

The Court said Henry Burden invented a machine and could only patent a machine. The Court noted that the iron undergoes a process that changes its qualities, but the "agent" that produced the change was pressure produced by a machine. The Court believed that Burden's particular machine design was necessary to roll cast iron in the form of puddler's balls into malleable iron. Hence, Burden's process claim should be confined to use of that machine. The reason was to avoid a scope error. Burden could not prevent others from rolling cast iron into malleable iron by using other machines because Burden had not described how to make other machines for that purpose. The problem with this decision is that the claim did seem to limit the process to one that used the machine Burden invented and described. Whether Burden patented his machine or a process of using his machine is of no significance. The scope of the rights are the same for both types of claims.

In 1877 (*Cochrane v. Deener*), an inventor described a process for manufacturing flour by separating components of flour with cloths of various "mesh" sizes and currents of air. The process was carried out by a machine. The Court did not discuss the claims. The defendant used different devices than those described in the patent. The Court said this did not prevent infringement:

That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. If one of

the steps of a process be that a certain substance is to be reduced to a powder, it may not be at all material what instrument or machinery is used to effect that object, whether a hammer, a pestle and mortar or a mill. Either may be pointed out; but if the patent is not confined to that particular tool or machine, the use of the others would be an infringement, the general process being the same. A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as a piece of machinery. In the language of the patent law, it is an art.

In 1881 (*Tilghman v. Proctor*), the Court again said that a process may be patentable independently of the particular devices described for carrying it out. The patent described a way of converting fats to fatty acids and glycerine by treating fats with water at high temperatures and pressure. The patent described pumping the fats and water through coils of pipe contained in a furnace. The patent also said the process could be carried out in “any convenient vessel.” The patent described the invention as a process. The patent claimed “the manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure.” The Court declared that this was a claim to the process of manufacturing. The defendant did not use coils of pipe, when it carried out the process. There was still infringement. The Court asked rhetorically, “how can we, by any fair rule of construction, circumscribe this claim in such a manner that it shall only cover the process when applied in the use of a coil of pipe”

The Court also explained why Tilghman’s claim was different from Morse’s claim 8. The Court said Tilghman claimed a process and Morse claimed a “mere principle.” The Court implied in *Tilghman* that the problem is one of “particularity”:

The eighth claim of Morse’s patent was held to be invalid, because it was regarded by the court as being not for a process, but for a mere principle. It amounted to this, namely: a claim of the exclusive right to the use of electromagnetism as a motive power for making intelligible marks at a distance; that is, a claim to the exclusive use of one of the powers of nature for a particular purpose. It was not a claim of any particular machinery, nor a claim of any particular process for utilizing the power but a claim of the power itself, a claim put forward on the ground that the patentee was the first to discover that it *could* be thus employed.

* * *

Let us apply these principles to the present case. In the first place, the claim of the patent is not for a mere principle. The chemical principle or scientific fact upon which it is founded is, that the elements of neutral fat require to be severally united with an atomic equivalent of water in order to separate from each other and

become free. This chemical fact was not discovered by Tilghman. He only claims to have invented a particular mode of bringing about the desired chemical union between the fatty elements and water. He does not claim every mode of accomplishing this result. He does not claim the lime-saponification process, nor the sulphuric-acid distillation process, and if, as contended, the result was accomplished by Dubrunfaut, Wilson, and Scharling, by means of steam distillation, he does not claim that process. He only claims the process of subjecting to a high degree of heat a mixture continually kept up, of nearly equal quantities of fat and water in a convenient vessel strong enough to resist the effort of the mixture to convert itself into steam. This is most certainly a process. [Emphasis original.]

In 1888 (*The Telephone Cases*), the Court focused on Alexander Graham Bell's invention of a way to transmit sounds over an electrical circuit - the telephone. Bell devised two ways to convert sound waves into corresponding variations in an electrical current. Bell described in detail a device that used induction of an electromagnet to cause variations in the current of a nearby wire. The Court called this the "magneto" method. Bell also said that one could produce variations in the current by increasing and decreasing the resistance of the circuit. The Court called this the "variable resistance" method. Unlike Morse, Bell did not claim the use of an electric current "however developed" for marking characters at a distance. Bell claimed a method and apparatus to transmit sounds "telegraphically, as herein described." Claim 5 read:

The method of, and apparatus for, transmitting vocal or other sounds telegraphically, as herein described, by causing electrical undulations, similar in form to the vibrations of the air accompanying the said vocal or other sounds, substantially as set forth.

The Court noted that Bell's patent defined an "electrical undulation" as "the result of gradual changes in intensity exactly analogous to the changes in the density of air occasioned by simple pendulous vibrations." Bell produced a "vibratory or undulatory" current of electricity. The Court said that Bell invented two things. Bell developed a process of creating changes in the intensity of a current corresponding to changes in the density of air called sounds and used that current to send and receive speech. Bell also developed a particular apparatus for doing so, an apparatus that used the electromagnets to change the current. The Court said claim 5 was limited to what Bell had invented and was entirely proper. The Court, as in *O'Reilly*, asked whether Bell was patenting his own "art" or "process." He was and his patent was proper.

In 1895 (*Risdon Locomotive Works v. Medalf*), the Court admitted that the line between patentable and unpatentable processes was obscure. The Court attempted to draw a line between patentable processes that involve "chemicals or other . . . similar elemental action" and unpatentable processes that "consist solely in the operation of a machine." The inventor devised a process for making an improved pulley having a metal rim and a separate center or "spider" for use with belts in machines. The process involved the steps of (1) centering the center or spider

of the pulley, (2) grinding the ends of the arms to make them concentric with the central axis of the pulley, (3) boring the center hole, (4) securing the rim to the center, (5) grinding the face of the rim concentric with the central axis, and (6) grinding the edges of the rim. The Court said the process was “purely a mechanical one.” The Court said the patent was directed to the process for manufacturing pulleys. The Court said a process was patentable if the process were a “chemical one,” such as in *Tilghman*, or “consisted in the use of one of the agencies of nature for a practical purpose,” such as in *The Telephone Cases*. The Court felt it “equally clear, however, that a valid patent cannot be obtained for a process which involves nothing more than the operation of a piece of mechanism, or in other words, for the function of a machine.” The Court said the distinction, “nowhere better appears than in the earliest reported case upon that subject, viz, *Wyeth v. Stone*, 1 Story, 273, in which the patentee claimed as his invention the cutting of ice of a uniform size by means of an apparatus worked by any other power than human.” The Court declared Philip Medart’s invention unpatentable, because he had invented a machine. The “operation or function” of the machine was not patentable.

In 1909 (*Expanded Metal Co. v. Bradford*), the Court found that patent could properly issue for a method of converting sheets of metal into sheets of “expanded metal” mesh useful in reinforced concrete structures. A flat sheet of metal was cut so that it had a row of incisions near one edge. The metal was then bent and stretched at a right angle to the sheet, a second row of incisions was made offset from the first row, and the stretching and bending repeated. The process converted the sheet into a type of “wire” mesh, called expanded metal. The claim called for “The herein described method of making open or reticulated metal work, which consists in simultaneously shifting and bending portions of a plate or sheet of metal . . . , and then shifting and bending portions of a plate or sheet of metal . . . , and then shifting and bending in places alternate to the first-mentioned portions . . . , substantially as described.” The Court said the process was patentable independently of the particular mechanisms, assuming people could avail themselves of some mechanism to carry out the process. However, the Court continued to insist that a process that was the mere function of the operation of a machine was not patentable.

In 1931 (*American Fruit Growers*), the Court declared unpatentable a claim to fresh fruit treated with borax to make the fruit resistant to blue mold rot and a process of treating fruit with borax. The patent said that before this invention, blue mold growth during shipment caused 30 to 40 percent losses. The patent claimed “fresh fruit of which the rind or skin carries borax in amount that is very small but sufficient to render the fruit resistant to blue mold decay” and a process comprising subjecting the fruit to an aqueous solution of borax.

The Supreme Court invalidated both types of claims. The Court said no product patent could be granted because a treated orange was a “natural article”, having only “the same beneficial uses” as an untreated orange. The fact that consumers would have 30 to 40 percent more treated oranges than untreated oranges did not matter. The legal issue was what Patent Act meant by a “manufacture.” After looking first to the dictionary, the Court found the ultimate answer in government’s definition of a “manufacture” for purposes of collecting tariffs. This definition indicated that fruit treated to prevent blue mold was not a manufacture and not subject to a tariff. Because the government would not tax importing or exporting the treated fruit, the Court said that fruit could not be patented. Anything the government decides not to tax is not

patentable. The Court said that if it is “assumed” the process was a patentable subject, the process was not novel.

In 1935 (*Smith v. Snow; Waxham v. Smith*), the Court found patentable a method for artificially incubating eggs, that is, hatching eggs without having chickens sit on them. The method required use of a machine. Smith described an incubator that had number of racks arranged around a central open column with a fan at the top to blow heated air down the column. Smith described how to maintain a constant temperature by circulating air around eggs in different stages of development. The eggs giving off heat would help heat the eggs taking up heat. The eggs absorbing heat would help cool eggs producing heat. Smith also provided small openings for carbon dioxide to escape, but too small to permit too much moisture loss. Smith claimed his device as a method. Claim 1 read:

The method of hatching a plurality of eggs by arranging them at different levels in a closed chamber having restricted openings of sufficient capacity for the escape of foul air without undue loss of moisture and applying a current of heated air, said current being created by means other than variations of temperature and of sufficient velocity to circulate, diffuse and maintain the air throughout the chamber at substantially the same temperature, whereby the air will be vitalized, the moisture conserved and the units of heat will be carried from the eggs in the more advanced stage of incubation to those in a less advanced stage for the purpose specified.

The Court refused to confine the scope of those claims to the operation of the process in the particular apparatus described in the patent. In a companion case, *Waxham v. Smith*, the Court rejected the view that the claims were invalid because they were an attempt to patent the function performed by a machine. The Court said Smith was not trying to patent the function which a machine performs, hatching of eggs. The Court said Smith was patenting a particular method of hatching eggs, by using of the difference in temperature of eggs in different stages of incubation and the flow of heat from one to the other to achieve the desired result. The Court said that, “By the use of materials [presumably an incubator, eggs and heated air currents] in a particular manner, he secured the performance of the function by a means which had never occurred in nature and had not been anticipated by the prior art; this is a patentable method or process.” The Court said that a method may be patented irrespective of the particular form of a mechanism of carrying it out. “A method, which may be patented irrespective of the particular form of the mechanism which may be availed of for carrying it into operation, is not to be rejected as ‘functional’ merely because the specifications show a machine capable of using it.”

In the 1970s and early 1980s, the Court decided three cases involving processes. These are the decisions that cause so much confusion. These are the decisions that mislead the Court of Appeals to find the “machine-or-transformation test” in the Court’s decisions. *Gottschalk v. Benson* and *Parker v. Flook* involved processes of transforming numbers and the Court found the processes unpatentable. *Diamond v. Diehr* involved a process of transforming rubber and the

Court found the process patentable. Hence, the decisions may easily be read to say transforming articles is patentable and transforming numbers is not.

These three decisions are difficult to understand and connect to the Court's earlier decisions, because they introduce a new rule – a mathematical formula or algorithm may not be patented. The Court should never have singled out mathematics as an inherently unpatentable subject. There is no clear line between mathematics and any other branch of science and even technology. Physicists, chemists, computer scientists, and engineers, who design an enormous variety of products use mathematics and the commercial products and processes they design are often best described and sometimes necessarily described using mathematical formulas.

In any event, this rule causes difficulty, because it is unclear whether this is an entirely new limit imposed for a new reason or is merely an application of one of the existing limits, as it seems to me to be. As I said earlier, the limit against patenting mathematical formulas should be viewed as an example of the limit against patenting abstract ideas or principles, whether mathematical or otherwise. Even if that difficulty is overcome, the results in the first two decisions are difficult to understand and seem to me incorrect.

In 1972 (*Gottschalk v. Benson*), the Supreme Court found unpatentable a process that could be used by a digital computer to convert data stored in a format called binary coded decimal (that computers were unable to use) into a format called pure binary form (that computers could use). The process could be carried out by a series of automatic operations using shift registers of a computer (as required by claim 8) or by the series of manual operations, assuming a person working with a piece of paper and pencil is carrying out a "data processing method" by "testing", "detecting" and "adding" (as required by claim 13). Suppose that in 1972, there were millions of financial records coded in binary coded decimal form unavailable for processing by computers and the only other way of converting that information to pure binary numbers was by hundreds of people reading the data in binary coded decimal form and writing it in pure binary form at a cost of \$50 million. Computers could be easily programmed to carry out the process of claims 8 or 13 and essentially do that conversion for nothing. The invention saved \$50 million and allows computers to process the data previously unavailable. The Supreme Court said this process could not be patented, because the conversion process was a mathematical algorithm and a mathematical algorithm was an unpatentable idea. I have difficulty with this result because it is unclear to me why the claims in this patent would create the types of costs, errors, and uncertainty I discussed earlier.

The Court of Appeals said that the Supreme Court's *Gottschalk v. Benson* decision was consistent with the "machine-or-transformation test" because the Supreme Court said the process was not patentable because the only use of the unpatentable principle was with a digital computer. In other words, the Supreme Court said a process was not patentable because a machine was the only practical way to carry out the process. From that decision, the Court of Appeals deduced that a process was patentable only if its use was tied to a machine. The inference, if anything, seems the opposite.

In 1978 (*Parker v. Flook*), the Court found unpatentable a process useful to define the safe and effective limits of time, temperature and other parameters in the catalytic conversion of

hydrocarbons in the oil refining industry. Because the refining process became inefficient and could become dangerous when certain limits on processing variables were exceeded, plants set alarm limits in various monitoring devices to alert them, if critical limits were exceeded. The patented process would update those limits so that a petroleum refinery could operate more safely and efficiently. The Court said no patent was available because the only “novel feature of the method is a mathematical formula” and the discovery of a new and useful mathematical formula could not be patented. Suppose the process would make available 10 percent more gasoline from a barrel of oil. Under the Court’s analysis, this would not matter. Applied mathematics must be free. Again, I have difficulty with this result because it is unclear to me why the claims in this patent would give rise to unacceptable costs, errors, and uncertainty. It is possible the Court reached the result it did, because it believed the process claimed, including the formula, was abstract. The Court noted that the process did not specify the precise operating limits for carrying out catalytic conversion of hydrocarbons. However, it is far from clear that this is a reason for the Court to find the process unpatentable, since operating limits for different plants carrying out different catalytic conversion processes will vary.

In 1981 (*Diamond v. Diehr*), the Court found patentable a process of operating a press used to mold uncured synthetic rubber using pressure and heat into cured products that retained their shape. Total time for proper curing a particular batch depended on a number of parameters including the temperature of the rubber. The invention was a process of continually measuring the temperature of the press, using a computer to calculate the precise cure time for each batch using an equation that had long been used to estimate cure times, and opening the press automatically at the time indicated by those calculations. The Court said its earlier decisions on processes were correct, but this process was different. The only difference between the unpatentable catalytic hydrocarbon process and the patentable molding process was the hydrocarbon process ended with updating alarm limits to alert plant operators to adjust operating conditions and the molding process ended with opening a mold. The step of automatically opening the mold was of no economic significance. The process reduced the cost of making shaped articles, because the cure time was determined more accurately and fewer under-cured and over-cured articles had to be thrown away. Costs were reduced the same amount whether the mold automatically opened at the right time or a workman opened the mold when an alarm went off.

Based on the Court’s *Diehr* decision, the mistake the lawyers for *Parker v. Flook* inventors apparently made was not saying the last step of the process was automatically changing operating conditions based on updated alarm limits. However, adding that step to the *Parker v. Flook* process would have had little or no economic significance. The process reduced the cost and risk of operating a catalytic conversion plant the same amount whether a workman changed operating conditions or a machine changed operating conditions. If, as I hypothesized, the process would make available 10 percent more gasoline from a barrel of oil, this improvement is achieved either way.

I will mention one other opinion, though it is not a decision of the Court on the merits. In 2006 (*Laboratory Corp. v. Metabolite*), two of the Justices who will decide *Bilski*’s fate said a method a doctor could use to determine whether a patient had a deficiency of two important vitamins should be unpatentable. This vitamin deficiency could cause mild and sometimes severe

anemia. The inventors established a relationship between elevated levels of a particular amino acid in all forms and this particular deficiency. They patented a method of diagnosing this deficiency by assaying a body fluid for an elevated level of the amino acid and correlating an elevated level with this deficiency. Justice Breyer, joined by Justices Souter and Stevens, said this method should be unpatentable, because the amount of the amino acid in a patient fluid and the existence of a vitamin deficiency was a “natural phenomenon” or “phenomenon of nature”, even though doctors did not know it before the invention. Without the invention, the process would never be carried out since doctors would not order assays for this amino acid when trying to diagnose the cause of anemia. This unknown natural phenomena was useless until discovered and once discovered permits a new and better diagnosis process – carry out an assay and review the results. This assumes, of course, that the necessary assay was already available or the patent application described how to perform the necessary assay. If the necessary assay was not already available and the patent application did not describe how to perform the necessary assay (or described one assay and claimed all assays), I agree with Justices Breyer and Stevens that no patent should issue.

Unlike these Justices, I am entirely in favor of someone finding a natural phenomena that will allow my doctor to order an assay and determine that I have very early stage cancer when it may be successfully treated rather than not ordering an assay and telling me I have cancer when it too late to do much about it. However, Justice Breyer was dead right to point out that “sometimes *too much* patent protection can impede” the progress patent law seeks and the limits on patents are designed to prevent this harm.

XI. ARE PROCESSES OF MAKING OR USING DATA PATENTABLE?

The Court of Appeals said *Bilski*'s process could not be patented, because it does not use a machine and does not transform a particular “article” into a different state or thing. The Court of Appeals said *Bilski*'s process transformed legal obligations and these obligations are not physical objects or data representative of physical objects. This implies that processes that operate on some types of data are patentable. However, the only data that qualifies is data representing a physical object. For this purpose, I use data to mean information representing anything (e.g. images, sounds, facts, facts that are false, opinions, numbers, and so on) in a form capable of being used in any way with machines of any kind (though primarily electronic devices). Data is transmitted and processed by electronic devices in the form of electrical signals. I use data to include data in the form of electronic signals.

Is there a reason to limit patentable processes to those involving making or using tangible objects? The answer depends on whether data has the characteristics of tangible products that enable the patent system to work for processes involving tangible products. At least some of characteristics of tangible products that permit patent right to work are that these products have economic value, exist in a state that permits everyone involved to recognize and identify them with little effort and ambiguity and distinguish one product from another, are supplied in a way that permits their economic value to be determined, and are supplied by easily identifiable suppliers to easily identifiable users. These and perhaps other characteristics permit patent rights to operate with low cost. Some types of data may have these characteristics and processes of producing or using such data should be patentable.

Assuming some processes of making or using data are patentable, a great deal of what happens in the United States economy involves transforming data from one form (call them the inputs) into another form (call them the outputs) that are more valuable to someone than the inputs. People pay lots of money for the outputs, because they are not able to generate them without assistance of others. This is true of data representing a patient's MRI scan, a person's checking account or credit card balance, or for Bilski the prices at which a commodity trader should buy and sell to reduce risk of changes in future market prices. There is no reason processes that convert data from one form to another should be limited to data representing a physical object. Data representing the state of someone's bones or blood is important. However, data representing the state of a person's investment or retirement account is also important, and on some days such as in September 2008, more important. There is no apparent reason that a process that generates data to help your doctor do a good job should be patentable and a process that generates data to help your banker or investment advisor do a good job should be unpatentable.

Machines that create data in a form suitable for storage, retrieval, transmission and other uses, store data, process certain data to generate other and more useful data, transmit data from one location and receive it at another location, transfer data from one machine to another machine, convert data into forms that people are able to see, hear or use, and on and on should, of course, be patentable. That is why the telegraph, the telephone, the cellular phone, the radio, the television, the sound system, the video system, the adding machine, the pocket calculator, the computer, the server, the router, the smart cellular telephone, and on and on are patentable. Patents should also be available for software that processes data. Software is a machine, albeit one that must be used with another machine, whether a stand-alone computer or a microcomputer that controls some other product. Software should be patentable. The furor over Bilski should not mean the end of the software industry. "Manufactures" that store data, such as the phonograph record, magnetic tape, magnetic disk, compact disk, and on and on should be patentable. "Manufactures" over which data is transmitted, such as coaxial cables and fiber-optic cables, should be patentable. Even "compositions" aid in storing and using data, such as memories made of doped silicon, disks made of reflective materials, tapes and drives made of magnetic materials, and on and on.

The only issue is whether patents should be available for a process that operates on data, when patents are already available for the machines, manufactures, and compositions that are used in carrying out such processes. My view is that they should be, if for no other reason than the Patent Act implies that processes may be patented in addition to machines, manufactures and compositions. A process involving data should be patentable, if the cost of patents on the process are low. If the Patent Act were interpreted to limit patents to processes of making or using machines, manufactures or compositions, a process involving data should be patentable, if the process may be carried out with a limited and identifiable group of machines, manufactures or compositions.

Finally, if the law limited patentable processes to processes of making and using products, is data a product for this purpose? In Patent Act lingo, is data itself a "manufacture"? This is one issue I will not address. If the machines, manufactures and processes used to create, store, change, use, and transmit data are patentable, and some particular machine, manufacture or

process is used with data in some new form, patents on those machines and so on should enable the inventor of data in a new form to capture the value of the new form. If that proves not to be true, then a more difficult issue arises and must be dealt with in the same way. May patents granted on data in some form operate at low cost? If so, there is no reason data should not be patentable.

XII. IS A SERVICE A PATENTABLE PRODUCT OR PROCESS?

If the law limited patentable processes to processes of making and using products, is a service a product or a process of making or using a product? On that issue, the Patent Act is not very helpful. Is a service a “manufacture”? Is a service a “process”? There are many types of services of incredible value to consumers. If permitted by the government, insurance companies permit consumers to share risks of unpredictable and adverse events that may befall some but not all of them during some period of time. Banks permit consumers keep their money in a safe place, earn money on money deposited in banks, buy products with checks, not cash, and borrow money. Accounting firms assist consumers and businesses to keep accurate, complete and informative records of financial and other aspects of operating some business and even living one’s life. Investment firms assist consumers in buying and selling securities and making investments. Law firms assist the public in dealing with often ridiculous complexities of the ridiculously large numbers of laws that impact our lives. Even the government and the courts provide services. Innovation occurs in these areas. Is it always technological innovation? Probably not. Is it sometimes technological innovation? Probably yes. Is there likely to be too little innovation in services without patents? Perhaps. May new services be patented without excessive costs, errors, uncertainty and transaction costs? In some situations, perhaps yes and in others probably not.

I know of no way to distinguish the two other than by asking for each service the types of questions I asked about Bilski’s process or by limiting patents on services to those carried out with machines, manufactures or compositions.