No. 08-964

In The Supreme Court of the United States

BERNARD L. BILSKI and RAND A. WARSAW,

Petitioners,

v.

JOHN J. DOLL, ACTING UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND ACTING DIRECTOR, PATENT AND TRADEMARK OFFICE,

Respondent.

On Writ Of Certiorari To The United States Court Of Appeals For The Federal Circuit

BRIEF OF ON TIME SYSTEMS, INC. AS *AMICUS CURIAE* IN SUPPORT OF NEITHER PARTY

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QUESTIONS PRESENTED

1. Whether the Federal Circuit erred by holding that a "process" must be tied to a particular machine or apparatus, or transform a particular article into a different state or thing ("machine-or-transformation" test), to be eligible for patenting under 35 U.S.C. § 101, despite this Court's precedent declining to limit the broad statutory grant of patent eligibility for "any" new and useful process beyond excluding patents for "laws of nature, physical phenomena, and abstract ideas."

2. Whether the Federal Circuit's "machine-or-transformation" test for patent eligibility, which effectively forecloses meaningful patent protection to many business methods, contradicts the clear Congressional intent that patents protect "method[s] of doing or conducting business." 35 U.S.C. § 273.

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INTEREST OF THE *AMICUS CURIAE*[1]

On Time Systems, Inc. is an advanced-technology company specializing in software for the optimization of complex industrial problems. The technology of On Time Systems has applications in numerous industries ranging from shipbuilding to the design of intelligent traffic control systems for urban areas. On Time Systems serves both public and private sector customers. The key executives at On Time Systems are Dr. Matthew Ginsberg and Dr. David Etherington, the co-founders of the University of Oregon's Computational Intelligence Research Laboratory ("CIRL"). Since its foundation, CIRL has been a leading research laboratory in artificial intelligence, search optimization and constraint satisfaction. On Time Systems was created to work with CIRL to develop and commercialize applications of optimization technology. The personnel of On Time Systems have multidisciplinary education, training and industry experience. For example, Dr. Ginsberg's education was as a relativistic astrophysicist and mathematician; Dr. Etherington was trained in computer science and artificial intelligence.

On Time Systems holds a number of patents on its technologies, and at the same time is aware that

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[1] In accordance with Sup. Ct. R. 37, On Time Systems states that this brief was not authored in whole or in part by counsel to a party, and that no monetary contribution to the preparation or submission of this brief was made by any person or entity other than this *amicus curiae* or its counsel.

third parties hold patents on technologies in the various industry segments in which On Time Systems operates. Those patents are the result of extensive and expensive research and development. Without patent protection, the results of those efforts could be easily copied by competitors, dramatically reducing the incentives for innovation.

On Time Systems has no interest in any party in the present case or any stake in the outcome of this case. Rather, On Time Systems has a strong interest that this Court interpret the patent law in a manner consistent with the constitutional underpinnings that have fostered the remarkable story of innovation that has defined this country from its agricultural beginnings, through the Industrial Age and now into the Information Age.[2]

INTRODUCTION AND SUMMARY OF THE ARGUMENT

The standard for patentability stated by the Federal Circuit below is too narrow. This brief addresses an issue that the Court will encounter in drawing the line between patentable and

[2] This brief is being filed with the consent of the parties. In accordance with Sup. Ct. R. 37.2(a), On Time Systems provided the parties with timely notice of its intention to file this *amicus curiae* brief. In accordance with Sup. Ct. R. 37.3(a), the parties have filed with the Clerk of this Court general consents to the filing of *amicus* briefs.

unpatentable subject matter. Whether an "abstract" claim is patentable depends critically on what one means by "abstract." This word has been used in many different ways in the analysis of patentable subject matter, often with little specificity as to the sense in which it is used. It is entirely appropriate for "abstract ideas" to be unpatentable if "abstract" refers to something qualitative considered apart from a subject or application, or if "ideas" refers to amorphous mental notions without any application outside the mind. Historically, claims directed to "laws of nature" have also been categorized as abstract ideas. One may question the accuracy of such categorization but the result, *i.e.*, unpatentability, seems appropriate in this usage as well.

However, when the word "abstract" is used to refer to specific applications that happen to manipulate abstract representations of things rather than physical objects, it is no longer sensible to presumptively rule out patentability on that basis alone. To extend a blanket preclusion against any claim labeled as "abstract" is to inaccurately conflate the distinct notions of abstractness and natural principles. Such a conflation does not honor the United States Constitution, the language used by Congress in § 101, this Court's precedents, or the realities of modern life. Inventions can be patentable without being of a sort that would hurt if you dropped them on your foot.

On Time Systems takes no position on whether Messrs. Bilski and Warsaw deserve a patent on their method for managing consumption risk costs. There

may well be any number of reasons that such an invention should not be afforded patent protection. On Time Systems does, however, believe that the first question presented by the Court must be answered in the affirmative. The exclusive test for patentability asserted by the Federal Circuit is far too limited in its analysis, particularly in the context of modern technological advances. On Time Systems urges the Court to reject that standard in favor of a more flexible one that is consistent with the encompassing language of § 101. There is simply no reason in precedent or principle to limit patents to inventions that center on physical transformations or use of a particular machine. And, in rejecting the standard below, the Court should take care to distinguish carefully between different concepts of abstractness.

DISCUSSION

I. THE TERM "ABSTRACT" HAS BEEN USED TO DESCRIBE SEVERAL DIFFERENT CONCEPTS

Numerous other *amici* have addressed the "laws of nature, physical phenomena, and abstract ideas" precedents of this Court in the briefs below and at the petition stage. On Time Systems will not repeat those presentations here. Rather, this brief will focus on a very narrow issue within the larger discussion: the various ways in which a process can be said to be "abstract" and how that impacts its patentability.

Much commentary about the scope of patentable subject matter has addressed the relationships between processes and "laws of nature, natural phenomena, and abstract ideas" as discussed, for example, in *Diamond v. Diehr*, 450 U.S. 175, 185 (1981). There remains a paucity of discussion about what may or may not make a process abstract *per se*. This is a critical determination, since a process that is abstract in one sense may as a result be un-patentable, while a process that is abstract in another sense should remain eligible for protection. The line-drawing that needs to be done in this regard is admittedly difficult, as shown by the fact that many of this Court's decisions regarding the boundaries of patentable subject matter have been accompanied by dissents evidencing a wide range of perspectives. This brief discusses four ways in which processes have been characterized as abstract. On Time Systems suggests that processes that are abstract solely because they involve manipulation of intangibles should not be disqualified from patent protection on that basis alone.

On Time Systems is not the first to recognize the need to undertake more detailed consideration of the precise words used in patentability analysis. This Court recognized it over 150 years ago:

> The word *principle* is used by elementary writers on patent subjects, and sometimes in adjudications of courts, with such a want of precision in its application, as to mislead. It is admitted, that a principle is not

> patentable. A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right. Nor can an exclusive right exist to a new power, should one be discovered in addition to those already known. Through the agency of machinery a new steam power may be said to have been generated. But no one can appropriate this power exclusively to himself, under the patent laws. The same may be said of electricity, and of any other power in nature, which is alike open to all, and may be applied to useful purposes by the use of machinery.
>
> In all such cases, the processes used to extract, modify, and concentrate natural agencies, constitute the invention. The elements of the power exist; the invention is not in discovering them, but in applying them to useful objects.

Le Roy v. Tatham, 55 U.S. 156, 174-175 (1852).

As detailed in the sections below, processes have historically been labeled as "abstract" in at least the four following distinct ways: (A) as reciting a law of nature; (B) as referring to a broad application of a law of nature without limitation; (C) as being vague and lacking specificity; and (D) as referring to manipulations of intangible entities. While there may be reason to preclude patentability for the first three categories, whether under § 101 or otherwise, there is no similar reason to condemn inventions as

unpatentable solely because they can be placed in the last category.

A. Laws of Nature

A first perspective on processes as abstractions focuses on those processes that merely recite a "law of nature," and nothing more. Thus, a process of using the Pythagorean theorem to determine the length of a diagonal support piece (such as to support a wall during construction) is appropriately thought of as simply reciting and attempting to "own" that theorem. This Court has, on a number of occasions, held such processes to be unpatentable attempts to wholly appropriate natural principles.

In *Funk Bros. Seed Co. v. Kalo Inoculant Co.,* 333 U.S. 127, 132 (1948), the Court recognized that an application of a newly discovered natural principle may be commercially valuable, but that is not sufficient to make a claimed invention patentable. "Even though it may have been the product of skill, it certainly was not the product of invention. There is no way in which we could call it such unless we borrowed invention from the discovery of the natural principle itself." In contrast, in *Mackay Radio & Telegraph Co. v. Radio Corp. of America*, 306 U.S. 86, 94 (1939), the Court held patentable an antenna structure based on a mathematical formula, and observed that, "While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with

the aid of knowledge of scientific truth may be." In *Parker v. Flook*, 437 U.S. 584, 591 (1978), the Court cited *Funk Bros*. and *Mackay Radio* for the analytical requirement that, "[T]he process itself, not merely the mathematical algorithm, must be new and useful." Where a particular mathematical algorithm merely restates a scientific truth, a subject matter limitation based on "laws of nature" makes sense.

B. Overbroad Claim Scope

A second perspective linking processes with "abstract ideas" is based on the potential overbreadth of such claims. This perspective arises where the claim recites a desired effect or result, with little or no limitation as to the mechanism for achieving that result.

For example, the Court found claim 8 of an invention by Samuel Morse to be unpatentable subject matter because it claimed use of electromagnetism to print intelligible characters at a distance, without regard to the means by which this could be accomplished. *O'Reilly v. Morse*, 56 U.S. 62, 117-120 (1853). The Court expressed its concern that such a results-oriented claim, if allowed, would violate a longstanding tenet of patent law "that any one who afterwards discovered a method of accomplishing the same object, substantially and essentially differing from the one described, had a right to use it." *Id*. at 119. The Court in that case could not reconcile such a broad grant with the

language Congress chose to use in enacting the patent law.

Over a hundred years later, the Court revisited *O'Reilly* and interim decisions in *Gottschalk v. Benson*, 409 U.S. 63, 68 (1972) and was likewise concerned about breadth, stating, "Here the 'process' claim is so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion."

C. Lack of Specificity

A third perspective has to do with vagueness and ambiguity of claims, particularly disembodied thoughts that are "abstract" in the sense of "an abstract principle, which means a principle considered apart from any special purpose or practical operation. . . ." *Le Roy*, 55 U.S. at 185 (Nelson, J., dissenting, quoting from the Lord Justice in a patent case before the Court of Sessions in Scotland).

More recently, the Court in *Benson* observed that the chemical process and physical acts involved in an earlier case were "sufficiently definite to confine the patent monopoly within rather definite bounds." *Benson*, 409 U.S. at 69 (distinguishing *Corning v. Burden*, 56 U.S. 252 (1853)). The use of the word "definite" twice in the same sentence suggests a focus not only on overbreadth as noted above, but also on lack of specificity. Concern about overbreadth of a patent claim can indeed come from either certainty

that the claim covers too much subject matter or uncertainty about the boundaries of the claim.

A process that is abstract in the sense that it remains unformed, ill-defined, or otherwise has not yet been reduced to reasonable certainty may well include subject matter that is outside the boundaries of 35 U.S.C. § 101. One of skill in the art would not be able to determine the metes and bounds of such a claim, and from that determine the scope of the inventor's exclusive right. A patent drawn on such matter also violates various other provisions of the patent law, most notably the requirements in 35 U.S.C. § 112 relating to written description, enablement, best mode, and definiteness. While in certain circumstances the question of patentable subject matter may be the most appropriate manner of preventing such abstract descriptions from being awarded patent protection, in most cases the sensible first line of defense against those should be the more directly applicable provisions of § 112.

D. Manipulation of Intangibles

A fourth way in which processes can be "abstract" is the one most relevant to On Time Systems and thousands of other companies and individuals in their daily endeavors. This fourth perspective addresses processes that are abstract only in that they involve manipulation of items that are not physical objects. Often, these items are representations of real-world things. For instance, On Time Systems has developed software used to route airplanes to minimize fuel

usage. This software uses various inputs, such as weather forecasts that predict wind speed. The personnel of On Time Systems do not necessarily measure wind speed directly, much less determine the actual force at which the constituent oxygen, nitrogen and other particles in the air strike an airplane fuselage. In this sense the processes developed by On Time Systems for determining desirable airplane routes or shipbuilding task schedules are abstract. Each such process deals primarily with representations of real world objects – abstractions – rather than with the real world objects themselves.

II. MANIPULATION OF INTANGIBLES ALONE IS AN INSUFFICIENT REASON TO PRECLUDE PATENTABILITY

For decades, patent applicants and the U.S. Patent and Trademark Office ("PTO") have sidestepped the muddiness of the "abstract" label by arguing that their processes really are manipulating physical objects, even when it is clear to those in the art that such physical manifestations are not core to the real innovation. The typical example is a patent application related to an algorithm.[3] Historically,

[3] This Court has recognized that the term "algorithm" is susceptible of various meanings and in the past has limited its consideration to purely mathematical algorithms. *See, e.g.*, *Diehr*, 450 U.S. at 186 n.9 ("Our previous decisions regarding the patentability of 'algorithms' are necessarily limited to the more narrow definition. . . ."). In its use in industry, "algorithm"

(Continued on following page)

applicants argue that their processes really are manipulating physical objects. They assert that computer memory is being manipulated (as it is), and suggest that this suffices to bind the abstract idea to a patentable process.

Avoiding the issue of abstractness in this manner may work in individual cases, but does not lead to a robust, generalizable solution to the issue. True, there is some manner of physical manipulation of elements of computer memory, and this does provide an appropriate basis for showing statutory subject matter. But to argue that an algorithm is not a process that manipulates abstract entities is to profoundly misdescribe it. Some algorithms manipulate representations of physical objects; others manipulate representations that may not have direct physical counterparts. There is no sound basis for making patentability turn solely on whether such a physical counterpart exists.

The prohibition against patenting laws of nature would have appropriately prevented Isaac Newton

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is used synonymously with "process" and "method" as a way to do something. Algorithms may themselves manipulate entities that may be abstract (*e.g.*, an algorithm for proving mathematical theorems) or may manipulate entities that refer to physical objects (*e.g.*, an algorithm for determining how to load troops and materiel onto a fleet of cargo planes so as to minimize the number of planes needed for a mission). In *Diehr*, the Court expressly declined to pass judgment about the patentability of algorithms that are not mere recitations of mathematical formulas. *Id*.

from patenting the laws of motion that bear his name. However, it is and should continue to be possible to patent a device that uses those laws of motion to accelerate a specific object, such as a bowling ball, to a set speed, such as seven miles per hour. A process for implementing such acceleration, specific to a bowling ball, is likewise patentable, even under the test set forth by the Federal Circuit below. The notion that such a process is unpatentable as usurping an idea is distinct from the issue of whether it deals with abstract entities rather than concrete objects. Computer algorithms are processes that just happen to manipulate data structures instead of bowling balls. Reliance on a statement that electrons in a computer's processing unit should be considered like bowling balls leads to the correct result (*i.e.*, patentable subject matter). However, such analysis leaves unaddressed the broader question of how to handle processes that do not have electrons or other physical counterparts on which the applicant can rely.

The previously mentioned process for routing airplanes to minimize fuel burn is very unlikely, at the end of the day, to manipulate aircraft directly. At most, perhaps a piece of paper is printed that is presented to the pilot. The protectable innovation, assuming that there is one, is in the development of novel methods for producing the information that is given to the pilot. The end result is not a deflection of the airplane's control surfaces. It is not the piece of paper. It is not the movement of electrons within the computer used to construct the flight plan. It is information itself, pure and simple. The patent bar,

PTO and bench should expressly acknowledge that manipulation of information or other abstract entities can be as applicable to the real world as can manipulation of physical objects. None of this Court's precedent precludes such recognition.

As another example, consider one of the most important open questions in mathematics – the so-called "Riemann hypothesis." This hypothesis posits certain attributes of the "zeroes" or "roots" of a particular mathematical function, which are the points at which the function equals zero. While the hypothesis is entirely theoretical, the implications regarding the distribution of prime numbers, with corresponding ramifications on cryptography, are profound. Since being postulated 150 years ago, mathematicians and computer scientists have analyzed countless zeroes of the function in question, all suggesting that the hypothesis is true. To this day, however, the Riemann hypothesis remains no more than a hypothesis. From a practical perspective, if empirical evidence suggests that the hypothesis is true, it is irrelevant whether it is a scientific truth, as a process that assumes it to be true might well be extremely valuable in cryptographic applications. A patent claim based on this conjecture could hardly be said to usurp a scientific truth if the hypothesis has not been proven to be true (and may subsequently turn out to have been false all along), so any assertion of unpatentability must be based on something other than a "law of nature" argument. There is no basis under § 101 for precluding from patent protection a

cryptographic process that manipulates abstract representations in accordance with this hypothesis.

III. THE FEDERAL CIRCUIT'S STANDARD IS CONTRARY TO CONGRESSIONAL INTENT AND THE COURT'S PRECEDENTS

Responding to the first question presented by the Court, the "machine-or-transformation" test utterly fails to recognize that at least some processes that manipulate abstract entities are eligible for patent protection, as set forth above. None of the Court's decisions recited above calls for such a blanket prohibition whenever a claimed process operates on things that are not physical.

Congress has been careful to draft into the patent law a highly inclusive description of patentable subject matter in § 101, while at the same time providing a number of filters in other sections to ensure that inappropriate subject matter does not get the benefit of patent protection. Sections 102 and 103 of the statute, both styled as "Conditions for patentability . . . " in their titles, protect against granting patents where prior work is the same as, or makes obvious, a newly claimed invention. Section 112 prevents vague and undeveloped notions from being conferred patent rights, requiring that a specification "contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise and exact terms as to enable any person skilled in the art . . . to

make and use the same. . . ."[4] Sections 302 and 311 permit the public to request *ex parte* and *inter partes* reexamination of a patent that may have been improvidently granted. Section 101, in contrast, provides language that can only be read as broad and permissive rather than limiting. As noted by this court in *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980), in choosing expansive terms for § 101, "modified by the comprehensive 'any,' Congress plainly contemplated that the patent laws be given wide scope." Congressional intent would hardly be served by foreclosing protection for processes that operate on intangibles, which are now such an important component of our industrial base.

[4] In *Tilghman v. Proctor*, 102 U.S. 707, 727-728 (1880), the Court analyzed the scope of patentability of processes and quoted from *O'Reilly*, 56 U.S. 119 to establish that an inventor deserves a patent

> [P]rovided he specifies the means he uses in a manner so full and exact that any one skilled in the science to which it appertains can, by using the means he specifies, without any addition to or subtraction from them, produce precisely the result he describes. And if this cannot be done by the means he describes, the patent is void.

O'Reilly, 56 U.S. 119. The Court in *Tilghman* held that such analysis (which would be § 112 analysis under today's patent law), "affords the key to almost every case that can arise." 102 U.S. at 728.

CONCLUSION

A process that is "abstract" because it does little more than recite a law of nature is qualitatively distinct from a process that is "abstract" because it manipulates non-concrete entities. As evidenced by the fact that a large portion of the world's industrial product is now comprised of intangible assets as opposed to material ones, modern society considers these non-physical objects to be just as "real" as their concrete counterparts. A new organism's genetic code is as real as (and in a philosophical sense indistinguishable from) the organism itself. A digital circuit is a digital circuit, whether expressed as a Boolean truth table, a state diagram, or a schematic of interconnected electronic components. Nothing in § 101 or in this Court's precedents calls for a talismanic requirement that a process, in order to be patentable, must be tied to a particular machine or transform a particular article into a different state or thing. The evolution of science and technology requires us to recognize that manipulations of representations are fully within the scope of patentable subject matter.

The Federal Circuit erred in asserting that the "machine-or-transformation" test is the exclusive analytical tool to be used to determine whether a process claim recites patentable subject matter. The Court should reject the narrow standard asserted below, and at the same time remain vigilant against endorsing any limitations that might have similar harmful effects. Some claims that are characterized

as "abstract" are properly excluded from patentability, but others clearly should not be. Specifically, the mere fact that a claimed process manipulates abstract entities should not be sufficient reason to consider it nonstatutory subject matter for patenting.

Respectfully submitted,

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