

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* JOHN R. HARRISON and PING TAK PETER TANG

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Appeal 2009-004609  
Application 10/798,757<sup>1</sup>  
Technology Center 2100

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Decided: March 8, 2010

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*Before* LEE E. BARRETT, JAY P. LUCAS, and JAMES R. HUGHES,  
*Administrative Patent Judges.*

LUCAS, *Administrative Patent Judge.*

DECISION ON APPEAL

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<sup>1</sup> Application filed March 11, 2004. The real party in interest is Intel Corporation.

STATEMENT OF THE CASE

Appellants appeal from a final rejection of claims 1, 3 to 12, and 14 to 22 under authority of 35 U.S.C. § 134(a). The Board of Patent Appeals and Interferences (BPAI) has jurisdiction under 35 U.S.C. § 6(b). Claims 2 and 13 are canceled.

We affirm.

Appellants' invention relates to a method of calculating a number more efficiently (Spec. 4, ll. 2-6). More specifically, the method entails determining floating-point transcendental functions, such as the sine and cosine mathematical functions (*id.*). In the words of Appellants:

[Sine] and [cosine functions] may each be computed in half of a parallel operation using the same instruction stream. In order to maintain this parallelism, an algorithm ... may use "branch-free" techniques to avoid special code for small arguments, which would otherwise create asymmetry between the [sine] and [cosine] instruction streams.

(Spec. 4, ll. 17-22).

Claim 1 is exemplary, and is reproduced below:

1. A method comprising:

reducing an input argument  $x$  of a function to a range reduced value  $r$  according to a first reduction sequence;

approximating a polynomial for a corresponding function of  $r$  having a dominant portion  $f(A)+\sigma r$  where  $A$

equals  $x$  minus  $r$ , and an absolute value of  $\sigma$  is a power of two; and

executing a single instruction multiple data floating point operation to obtain a first result for the function using the polynomial.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

None.

#### REJECTION

The Examiner rejects the claims as follows:

R1: Claims 1, 3 to 12, and 14 to 22 stand rejected under 35 U.S.C. § 101, as the claimed invention is directed to non-statutory subject matter.

Appellants contend that the claimed subject matter is statutory because the claims are not purely mathematical and meet the “useful tangible, and concrete” test. (*See* App. Br. 11, middle.) The Examiner contends that each of the claims is properly rejected (Ans. 4, bottom).

Only those arguments actually made by Appellants have been considered in this opinion. Arguments that Appellants could have made but chose not to make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

## ISSUES

The issues involve whether Appellants have shown that the Examiner erred in rejecting the claims under 35 U.S.C. § 101. The issues turn on whether the claimed subject matter is statutory. Specifically, the first issue is whether claim 1 meets the machine-or-transformation test set forth in *In re Bilski*, cited below. The second issue is whether independent claims 11 and 18 have a “real-world use” in accordance with the Board’s recent precedential opinion, *Ex Parte Gutta*, cited below.

## FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

### *Disclosure*

1. Appellants have invented a method, article, and system of calculating a number. (*See* claim 1; Spec. 4, ll. 2-4.)

## PRINCIPLES OF LAW

Appellants have the opportunity on appeal to the Board to demonstrate error in the Examiner’s position. *See In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006).

The Court of Appeals for the Federal Circuit (CAFC) has recently clarified the law regarding patent eligible subject matter for process claims. *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008) (en banc). The en banc court in *Bilski* held that “the machine-or-transformation test, properly applied, is the

governing test for determining patent eligibility of a process under § 101.” *Id.* at 956. The court in *Bilski* further held that “the ‘useful, concrete and tangible result’ inquiry is inadequate [to determine whether a claim is patent-eligible under § 101.]” *Id.* at 959-960. The court explained the machine-or-transformation test as follows:

The machine-or-transformation test is a two-branched inquiry; an applicant may show that a process claim satisfies § 101 either by showing that his claim is tied to a particular machine, or by showing that his claim transforms an article. *See [Gottschalk v.] Benson*, 409 U.S. [63, 70 (CCPA 1972)]. Certain considerations are applicable to analysis under either branch. First, as illustrated by *Benson* and discussed below, the use of a specific machine or transformation of an article must impose meaningful limits on the claim's scope to impart patent-eligibility. *See Benson*, 409 U.S. at 71-72. Second, the involvement of the machine or transformation in the claimed process must not merely be insignificant extra-solution activity. *See [Parker v.] Flook*, 437 U.S. [584, 590 (1978)]

*Id.* at 961-62.

The court declined to decide under the machine implementation branch of the inquiry whether or when recitation of a computer suffices to tie a process claim to a particular machine. As to the transformation branch of the inquiry, however, the court explained that transformation of a particular article into a different state or thing “must be central to the purpose of the claimed process.” *Id.* at 962. As to the meaning of “article,” the court explained that chemical or physical transformation of physical objects or substances is patent-eligible under § 101. *Id.* The court also explained that transformation of data is sufficient to render a process patent-eligible if the data represents physical and tangible objects, i.e., transformation of such raw data into a particular visual depiction of a physical object on a display. *Id.* at

963. The court further noted that transformation of data is insufficient to render a process patent-eligible if the data does not specify any particular type or nature of data and does not specify how or where the data was obtained or what the data represented. *Id.* at 962 (citing *In re Abele*, 684 F.2d 902, 909 (CCPA 1982) (process claim of graphically displaying variances of data from average values is not patent-eligible) and *In re Meyer*, 688 F.2d 789, 792-93 (CCPA 1982) (process claim involving undefined “complex system” and indeterminate “factors” drawn from unspecified “testing” is not patent-eligible)).

Laws of nature, physical phenomena and abstract ideas are excluded from patent protection. *Diamond v. Diehr*, 450 U.S. 175, 185 (1981).

“[L]imitations are not to be read into the claims from the specification.” *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993) (citing *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989)).

“[W]e conclude that [the] claim ... fails to recite any tangible practical application in which the mathematical algorithm is applied that results in a real-world use.” *Ex parte Gutta*, No. 2008-4366, 2009 WL 2563524, at \*9 (BPAI 2009) (precedential).

## ANALYSIS

From our review of the administrative record, we find that the Examiner presents his conclusions of unpatentability on pages 3 to 4 of the Examiner’s Answer. In opposition, Appellants present one main argument.

*Arguments with respect to the rejection  
of claims 1, 3 to 12, and 14 to 22  
under 35 U.S.C. § 101 [R1]*

Appellants' argument addresses the issue of statutory subject matter under 35 U.S.C. § 101.

Appellants argue: “[E]xecuting[, as claimed,] requires something other than math. A single-instruction, multiple-data point floating point operation is not math but is a computer operation that is a standard kind of operation in computers. Therefore, application to pure mathematics is precluded.” (App. Br. 11, middle).

In reply, the Examiner finds that exemplary claim 1 fails to produce a real-world or tangible result, instead merely producing a value of the function (Ans. 3, bottom). The Examiner further finds that even if claim 1 meets the “useful concrete and tangible result” test, the claimed invention covers every substantial practical application of the recited computations sine the computations would involve the use of a general purpose computer (*id.*).

We closely reviewed the Answer, the Briefs, and the evidence provided by Appellants in the form of a Microsoft definition for “single instruction multiple data” (SIMD). We begin the analysis by noting that the “useful, concrete, and tangible result” test (*see State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998)) relied upon by the Examiner in the Answer was later clarified by the decision in *In re Bilski*, cited above. Notwithstanding this observation, we agree with the Examiner.

In light of the CAFC's guidance on statutory subject matter in *Bilski*, cited above, we analyze claim 1 based upon the machine-or-transformation test. First, although claim 1 recites "executing a single instruction multiple data floating point operation," the claim fails to tie the method in with any machine or structure. Thus, the claim fails to meet the first prong of *Bilski*.

Second, regarding the "transformation" prong of the CAFC's *Bilski* test, we note that no object or article in the claim language is transformed by the claimed steps of "reducing an input argument," "approximating a polynomial," and "executing a ... data floating point operation to obtain a first result." A person of ordinary skill in the art would have recognized that the sole "result" of performing the steps of claim 1 is a number (*i.e.*, a mathematical outcome). We find that Appellants have invented a method of calculating a number (FF#1). We acknowledge that the Specification discloses an advantage associated with "branch-free" technique of computing the claimed "result" (Spec. 4, ll. 17-22). Appellants' technique is said to increase efficiency in computing numbers because the method avoids special codes for small arguments and, in turn, create processing efficiencies for use in "an Intel® Pentium 4® processor instruction set" (*id.*, ll. 12-13). However, limitations from the Specification will not be read into the claims. (*See In re Van Geuns*, cited above.). Since Appellants' claimed "result" is merely a number (*i.e.*, a mathematical abstraction) (FF#1), we conclude that claim 1 fails to meet the transformation prong of *Bilski*. We thus conclude that Appellants' claim 1 meets neither the machine nor the transformation prong of *Bilski*, cited above. Accordingly, we find no error regarding claim 1.

Independent claims 11 and 18 recite an “article” and a “system,” respectively. The claims include a “storage medium” (claim 11), as well as a “processor” coupled to a “dynamic random access memory” (claim 18).

“[W]e conclude that [the] claim ... fails to recite any tangible practical application in which the mathematical algorithm is applied that results in a real-world use.” *Ex parte Gutta*, cited above.

We find that that the mathematical algorithms recited in claims 11 and 18 are abstract ideas having no “real-world use” in accordance with the teachings of *Ex Parte Gutta*. That is, Appellants’ claim limitation “to obtain a first result for the function using the polynomial” is merely the calculation of a number. In light of *Gutta*, Appellants’ claimed “result” fails to meet the statutory subject matter test under 35 USC § 101 since number calculation alone (*i.e.*, absent any application of the number in a useful manner) has no claimed “real-world” value. Further, we treat Appellants’ addition of recited structure (*i.e.*, the claimed “storage medium,” “processor,” and “dynamic random access memory” of claims 11 and 18) to the underlying method of calculating a “result” as merely a *pro forma* claims drafting technique. These recitations do not affect the “result” in any way. To the extent (if any) these recitations represent structural elements, they are merely “insignificant extra-solution activity” or “field-of-use limitations” as described in the *Bilski* decision. *Bilski*, 545 F.3d at 957. In other words, claim 11 and claim 18 are simply method claims dressed in the format of an article and a system, respectively. Accordingly, we find no error in the rejection of claims 11 and 18.

Appeal 2009-004609  
Application 10/798,757

### CONCLUSION OF LAW

Based on the findings of facts and analysis above, we conclude that the Examiner did not err in rejecting claims 1, 3 to 12, and 14 to 22.

### DECISION

The Examiner's rejection [R1] of claims 1, 3 to 12, and 14 to 22 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

peb

TROP, PRUNER & HU, P.C.  
1616 S. VOSS ROAD, SUITE 750  
HOUSTON, TX 77057-2631