

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte OLIVER B. DOWNS,
HAGAI ATTIAS, CHRISTOPHER J.C. BURGES
AND ROBERT L. ROUNTHWAITE

Appeal No. 2006-2765
Application No. 10/372,160

ON BRIEF

Before HAIRSTON, DIXON, and SAADAT, Administrative Patent Judges.
HAIRSTON, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1 through 30.

The disclosed invention relates to a computer-implemented global optimization method that employs a quantum mechanical tunneling technique to determine an optimal solution of a problem from among a plurality of solutions.

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Claim 1 is illustrative of the claimed invention, and it reads as follows:

1. A computer-implemented global optimization system comprising:

an input component that receives a problem, the problem being based, at least in part, upon a mathematical function;

an optimization component that employs a quantum mechanical tunneling technique in connection with determining an optimal solution of the problem from among a plurality of solutions, the determination being based, at least in part, upon utilities associated with the respective solutions; and,

an output component that provides the optimal solution determined by the optimization component.

The references relied on by the examiner are:

Atkins et al. (Atkins), "Molecular Quantum Mechanics," Oxford University Press, Third Edition, 1997, pages 54 through 56, 164 through 201 and 304 through 308.

Gomez et al. (Gomez), "The Tunnelling Method For Solving The Constrained Global Optimization Problem With Several Non-Connected Feasible Regions," Lecture Notes in Mathematics, Springer-Verlag, Volume 909, 1982, pages 34 through 47.

Claims 1 through 11 and 28 through 30 stand rejected under the second paragraph of 35 U.S.C. § 112 for indefiniteness.

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Claims 1 through 30 stand rejected under the first paragraph of 35 U.S.C. § 112 for lack of enablement because the claims allegedly fail to satisfy 35 U.S.C. § 101.

Claims 1 through 30 stand rejected under 35 U.S.C. § 101 as being directed to nonstatutory subject matter.

Claims 12 through 15, 17, 18 and 20 through 27 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Atkins.

Claims 1 through 5, 7 through 9, 11 and 28 through 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Atkins in view of Gomez.

Claims 6 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Atkins in view of Gomez and admitted prior art found on pages 9 through 13 and 16 of the specification.

Claims 16, 19 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Atkins in view of the admitted prior art.

Reference is made to the final rejection, the briefs and the answer for the respective positions of the appellants and the examiner.

OPINION

We have carefully considered the entire record before us, and we will sustain the indefiniteness rejection of claims 1 through 11 and 28 through 30, reverse the lack of enablement rejection of claims 1 through 30, sustain the nonstatutory rejection of claims 1 through 30, sustain the anticipation rejection of claims 12 through 15, 17, 18 and 20 through 27, and sustain the obviousness rejections of claims 1 through 11, 16, 19, 25 and 28 through 30.

Turning first to the indefiniteness rejection, the examiner states (answer, page 9) that “[t]he claims are rendered indefinite because it is not clear how ‘quantum mechanical tunneling’ is being used to solve the problem of global optimization.” Although we agree with the appellants’ argument (reply brief, page 7) that “quantum mechanical tunneling” is well known in the art, we must agree with the examiner’s conclusion (answer, page 25) that “the intended scope of the claims would not be apparent to one of ordinary skill in the art” because the disclosure does not provide ample warning “as to what constitutes infringement” of the claimed invention. Simply stated, the claims do not set forth the metes and bounds of the “optimal solution” of the problem. When is the “optimal solution” reached?

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An “optimal solution” for one problem may not be an “optimal solution” for another problem. For these reasons, the indefiniteness rejection of claims 1 through 11 and 28 through 30 is sustained.

The lack of enablement rejection of claims 1 through 30 is reversed because we see no need for a per se finding of lack of enablement that dovetails onto the nonstatutory rejection, and because the examiner has failed to provide a cogent reason for such a lack of enablement rejection.

Turning next to the nonstatutory rejection of claims 1 through 30, the examiner made the following findings (final rejection, page 4):

[T]he Examiner finds that Applicant manipulated a mathematical “problem” or “function” using pure “mathematical algorithms” to find an abstract “optimal solution.” Said mathematical algorithms may further be said to represent laws of nature. (The Examiner notes that the Supreme Court has held that “mathematical algorithms” and “laws of nature” are per se nonstatutory.) The Applicant does not set forth nor claim a practical application for the invention. As shown herein, mere global optimization of an abstract “function” or “problem” to find an abstract “optimal solution” does not fulfill the requirement that a “useful, concrete and tangible” result be accomplished.

Since the claims are not limited to exclude such abstractions, the broadest reasonable

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interpretation of the claim limitations includes such abstractions. Therefore, the claims are impermissibly abstract under 35 U.S.C. 101 doctrine.

Appellants argue inter alia (brief, page 7) that “the claimed invention determines an optimal solution to complex and oftentimes intractable problems (*e.g.*, modeled as mathematical functions) *vis-à-vis* a quantum mechanical tunneling technique (QMTT) and outputs the optimal solution to the problem *via* a monitor, printer and/or other output device and thus, provides a ***concrete, tangible and useful*** result (*e.g.*, the displayed, printed, *etc.*, optimal solution to the problem).”

In response, the examiner indicates (answer, page 21) that:

A first distinction in the present case is that the claimed invention takes as an input “a problem” or “a function,” which is *purely abstract and mathematical* in nature and further having *no real-world application*. Similarly, the output is merely an abstract solution to the abstract “problem.” Since the initial problem has no real-world application, the solution similarly has none. In particular, merely finding the global minimum of some problem or function, where that solution is not applied to a real-world problem, is not sufficient to provide a concrete, useful, and tangible result. Regardless of the output means used to provide this abstract solution - whether it

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be through a printer, a visual display, or other means - the invention as a whole lacks a practical application. In contrast to Alappat, the present claims are not directed towards an improved computer system itself, but merely towards a *use* for a computer system, where said use has no practical application.

We agree with the examiner's position that the claims on appeal are directed to a mathematical abstraction that does not lead to a practical application.

Accordingly, the nonstatutory subject matter rejection of claims 1 through 30 is sustained.

Turning to the anticipation rejection of claims 12 through 15, 17, 18 and 20 through 27, we agree with the examiner's findings (answer, page 10) concerning the teachings of Atkins. We additionally agree with the examiner (answer, page 10) that:

The numerical techniques of Atkins' chapters 6 and 9 inherently require the use of a global optimization system, such as a computer system, in order for them to be applied. Atkins specifically discloses the use of a computer system (pg. 307, "Even with increases in computer speed...dozen atoms.") and software packages requiring a computer system (pg. 314, "Sophisticated software...range of scientists.") A computer system capable of performing the methods recited by Atkins would inherently

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include at least a user interface, an output device, a CPU and a memory.

Appellants' argument (brief, page 13) concerning a "global minimum" are not commensurate in scope with the invention set forth in claims 12 and 21.

We agree with the appellants' argument (brief, page 14) that the disclosure uses "quantum mechanical tunneling" to determine the "optimal solution."

On the other hand, we hereby decline to read "quantum mechanical tunneling" into claims 12 and 21. A feature found only in appellants' specification will not be read into the claims. In re Prater, 415 F.2d 1393, 1405, 162 USPQ 541, 551 (CCPA 1969). Appellants' argument (brief, page 14) that Atkins fails to teach modeling is without merit because the solving of the equations in Atkins is tantamount to modeling. In summary, the anticipation rejection of claims 12 through 15, 17, 18 and 20 through 27 is sustained.

Turning next to the obviousness rejection of claims 1 through 5, 7 through 9, 11 and 28 through 30, and appellants' arguments concerning Atkins (brief, page 15), we find that Atkins uses a computer, like the disclosed and claimed invention, to solve the equations to reach the same

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result. Thus, the obviousness rejection of claims 1 through 5, 7 through 9, 11 and 28 through 30 is sustained.

Turning lastly to the obviousness rejections of claims 6, 10, 16, 19 and 25, we hereby sustain these rejections because of the lack of any patentability arguments for these claims in the main brief.

DECISION

The decision of the examiner rejecting claims 1 through 11 and 28 through 30 under the second paragraph of 35 U.S.C. § 112 is affirmed. The decision of the examiner rejecting claims 1 through 30 under the first paragraph of 35 U.S.C. § 112 is reversed. The decision of the examiner rejecting claims 1 through 30 under 35 U.S.C. § 101 is affirmed. The decision of the examiner rejecting claims 12 through 15, 17, 18 and 20 through 27 under 35 U.S.C. § 102(b) is affirmed, and the decision of the examiner rejecting claims 1 through 11, 16, 19, 25 and 28 through 30 under 35 U.S.C. § 103(a) is affirmed.

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