UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RALPH MOESSNER and STEFAN THEIS

Appeal 2008-1148
Application 11/021,591
Technology Center 2800

Decided: June 30, 2008

Before ALLEN R. MACDONALD, SCOTT R. BOALICK,
and JOHN A. JEFFERY, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's rejection of claims 1-8. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

Appellants invented a method and system for determining characteristic parameters on the basis of values descriptive of a predetermined process. The method (1) computes differences between pairs of values in a time series; (2) determines the median value of these computed differences; and (3) computes a trend parameter based on the determined median value.[1] Such a technique enables forecasting a process on the basis of the series of values by correcting for outliers in the time series. Claim 1 is illustrative:

1. A method comprising:

determining characteristic parameters on the basis of a series of m values (H_1, H_2, ..., H_m) over time, the values being descriptive for a predetermined process, the series having linear characteristics, the determining including:

a) computing differences, denoted as Δ_i, between pairs of values (H_i, H_i+p) of points (t_i, t_i+p) of the historical time series, the points having a predetermined time distance to each other, denoted as p;

b) determining the median value, denoted as Δ_i_M, of the computed differences Δ_i;

c) computing, on the basis of the determined median value Δ_i_M, a trend parameter, denoted as T, T being defined as T = Δ_1_M/p.

[1] *See generally* Spec. ¶¶ 0003-33.

The Examiner relies on the following prior art references to show unpatentability:

Datta US 5,748,781 May 5, 1998

Bob Fisher, *Spatial Filters - Median Filter*, Dept. of Artif. Intell., Univ. of Edinburgh, United Kingdom, 1994, *available at* http://web.archive.org ("Fisher").

1. Claims 1-8 stand rejected under 35 U.S.C. § 101 as being directed to nonstatutory subject matter.
2. Claims 1, 2, and 8 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Datta and Fisher.

Rather than repeat the arguments of Appellants or the Examiner, we refer to the Briefs and the Answer for their respective details. In this decision, we have considered only those arguments actually made by Appellants. Arguments which Appellants could have made but did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

OPINION

The § 101 Rejection

We now consider the Examiner's § 101 rejection of claims 1 through 8 -- all claims on appeal. Since Appellants separately argued the patentability of independent claims 7 and 8 (App. Br. 12-13; Reply Br. 9), we treat method claims 1-6 separately from claims 7 and 8.

Claims 1-6

The Examiner takes the position that the claims as a whole recite an abstract idea since the claims merely manipulate data via a mathematical algorithm, namely by (1) computing differences; (2) determining median values; and (3) finding a trend parameter. According to the Examiner, there is no subsequent transformation outside the computer, nor are the claims limited to a practical application.

Appellants contend that the recited method and system generates useful, concrete, and tangible results, namely trend data and seasonal indices data for a process (App. Br. 10). According to Appellants, both of these data have real-world application to forecasting supply and demand for supply chain management and similar business processes. By allowing prediction of process development, Appellants contend, these forecasted values are used in a tangible way to improve process performance (App. Br. 10-11; Reply Br. 5-6).

Appellants also argue that the claimed invention does not cover every substantial practical application of an abstract idea, but is limited to a historical time series that describes a process. Moreover, Appellants contend, the final results of the claimed invention do not cover every practical use, but rather are limited to a trend parameter, seasonal indices, or forecast values (App. Br. 11-12).

The dispositive issue before us, then, is whether Appellants have shown that the Examiner erred in concluding that the claimed invention is not directed to statutory subject matter under § 101. For the following reasons, we find no such error has been shown.

Under § 101, there are four categories of subject matter that are eligible for patent protection: (1) processes; (2) machines; (3) manufactures; and (4) compositions of matter. 35 U.S.C. § 101. While the scope of patentable subject matter encompassed by § 101 is "extremely broad" and intended to "include anything under the sun that is made by man," it is by no means unlimited. *In re Comiskey*, 499 F.3d 1365, 1375 (Fed. Cir. 2007) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980)). For example, laws of nature, abstract ideas, and natural phenomena are excluded from patent protection. *Diamond v. Diehr*, 450 U.S. 175, 188 (1981).

It is the second exclusion noted above -- abstract ideas -- that is relevant to the appeal before us. Thus, even though the claimed invention may nominally recite subject matter that falls within the enumerated categories under § 101, as Appellants indicate (Reply Br. 5), the claimed invention still does not recite patentable subject matter if the claim as a whole is nonetheless directed to an abstract idea.

As the U.S. Supreme Court has noted, "'[a]n idea of itself 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.'" *Id.* at 185 (citations omitted). Additionally, our reviewing court recently articulated the following two distinct aspects of abstract ideas:

> First, when an abstract concept has no claimed practical application, it is not patentable….
> Second, the abstract concept may have a practical application….In [the context of industrial processes], the Supreme Court has held that a claim reciting an algorithm or abstract idea can state statutory subject matter *only if*, as employed

> in the process, *it is embodied in, operates on, transforms, or otherwise involves another class of statutory subject matter, i.e., a machine, manufacture, or composition of matter*….Thus, a claim that involves both a mental process and one of the other categories of statutory subject matter (i.e., a machine, manufacture, or composition) may be patentable under § 101.

Comiskey, 499 F.3d at 1376-77 (emphasis added).

The court in *Comiskey* further noted:

> [Section 101] does not allow patents to be issued on particular business systems…that depend entirely on the use of mental processes. In other words, the patent statute does not allow patents on particular systems that depend for their operation on human intelligence alone….Thus, it is established that the application of human intelligence to the solution of practical problems is not in and of itself patentable.

Id. at 1378-79 (emphasis added).

With these principles in mind, we turn to the claims on appeal before us. Independent claim 1 is directed to a method of determining characteristic parameters on the basis of a linear series of values over time, the values descriptive for a predetermined process. This determination includes (1) computing differences between pairs of points of the historical time series, where the points have a predetermined time distance to each other; (2) determining the median value of the computed differences; and (3) computing a trend parameter on the basis of the determined median value. Independent claim 3 recites commensurate limitations, but pertains to a cyclic series and adds the computation of "seasonal indices."

Interpreting claims 1 and 3 as a whole,[2] we find the processes recited in these claims are not tied to another statutory class of subject matter (e.g., a machine), nor do they transform the underlying subject matter to another state or thing. Rather, the claimed processes merely compute "trend parameters" based on the differences between points in a time series and the median value of those differences. Also in claim 3, "seasonal indices" are computed.

In our view, these computation methods are analogous to the computation methods that the U.S. Supreme Court found to be unpatentable in *Gottschalk v. Benson*, 409 U.S. 63 (1972) and *Parker v. Flook*, 437 U.S. 584 (1978). In *Benson*, the Court held that claims directed to a method for converting binary-coded-decimal (BCD) numerals into pure binary numerals for use with a general-purpose digital computer were nonstatutory under § 101. In reaching this conclusion, the Court found that the process claim was "so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion." *Id.* at 68. The Court further noted that "[t]he mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself." *Id.* at 71-72.

The Court in *Flook* held that a claimed method of updating the value of an alarm limit on at least one process variable involved in a catalytic

[2] *See Diamond v. Diehr*, 450 U.S. 175, 188 (1981) ("In determining the eligibility of respondents' claimed process for patent protection under § 101, their claims must be considered as a whole.").

conversion process was not statutory subject matter under § 101. *Flook*, 437 U.S. at 594-96. In reaching this conclusion, the Court in *Flook* noted that the recited "alarm limit" was merely a number, and the method essentially consisted of three steps: (1) measuring the present value of the process variable; (2) using an algorithm to calculate an updated alarm-limit value; and (3) adjusting the alarm limit to the updated value. *Id.* at 585.[3] Notably, the Court emphasized that while the claims in that case "cover[ed] a broad range of potential uses of the method" (e.g., in the petrochemical and oil-refining industries), the claims nonetheless did not cover every conceivable application of the formula. *Id.* at 586.

Here, claims 1 and 3 effectively recite methods that compute parameters and indices that, in our view, are so broad as to cover essentially every substantial practical application of the abstract idea. These computation methods effectively recite an abstract idea since they merely involve mathematical manipulations via an algorithm as in *Benson* and *Flook*. That a machine, such as a computer, is not even recited to implement the computation method renders the claimed invention even more abstract than the methods found to be nonstatutory in *Benson* and *Flook.* Furthermore, the absence of a machine only reinforces our conclusion that the method is nonstatutory as nothing precludes such recited computations solely via human intelligence. *See Comiskey*, 499 F.3d at 1376-79. Nevertheless, even if claims 1 and 3 did nominally recite a computer for such computations, such "[n]ominal recitations of structure in an otherwise

[3] The Court acknowledged that even though these computations could be done by hand, the disclosure nonetheless indicated that the formula was "primarily useful for computerized calculations producing automatic adjustments in alarm settings." *Id.* at 586.

ineligible method fail to make the method a statutory process." *Ex parte Langemyr*, No. 2008-1495, at 20 (BPAI May 28, 2008) (Informative) (citing *Gottschalk v. Benson*, 409 U.S. 63, 71-72 (1972)), *available at* http://www.uspto.gov/web/offices/dcom/bpai/informative_opinions.html (last visited June 12, 2008).

Additionally, as the Examiner indicates (Ans. 7), the mathematical manipulations recited in the claimed invention cover a broad range of applications. Indeed, Appellants' Reply Brief actually reinforces this notion. Specifically, Appellants ask why a method would suddenly become patentable when applied to, for example, a manufacturing process, when a claim that does not recite a manufacturing process does not (Reply Br. 8). The short answer is *pre-emption*, a concept that becomes strikingly clear when comparing the *Flook* and *Benson* cases with *Diamond v. Diehr*, 450 U.S. 175 (1981).

In *Diehr*, the claimed invention was directed to a process for curing synthetic rubber. The Court held that a physical and chemical process for molding precision synthetic rubber products was statutory subject matter under § 101 because the claims involve a transformation of an article to a different state or thing and "[i]ndustrial processes such as this are the types which historically been eligible to received the protection of our patent laws." *Id.* at 184.

In contrast to the facts in *Flook*, the Court noted:

> [R]espondents here do not seek to patent a mathematical formula. Instead, they seek patent protection for *a process of curing synthetic rubber*. Their process admittedly employs a well-known mathematical equation, *but they do not seek to pre-empt the use of that equation*. Rather, they seek

> only to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process. These include installing rubber in a press, closing the mold, constantly determining the temperature of the mold, constantly recalculating the appropriate cure time through the use of the formula and a digital computer, and automatically opening the press at the proper time.

Id. at 187 (emphasis added).

Unlike the processes in *Benson* and *Flook*, the process in *Diehr* was limited to a particular industrial process (i.e., a process for *curing synthetic rubber*). Although this process employed a mathematical equation, the claim nonetheless *recited steps that were germane to that particular process* (i.e., installing rubber in the press, closing the mold, constantly determining its temperature, constantly recalculating the appropriate cure time using the formula, etc.). As such, the claimed invention in *Diehr* did not pre-empt the use of the mathematical equation involved, but merely covered the use of the equation in conjunction with the other recited steps of that particular rubber curing process.

This distinction, in our view, cogently answers Appellants' question on page 8 of the Reply Brief regarding why a method suddenly becomes patentable when applied to a manufacturing process as compared to one that does not recite such a process. And it is this distinction that is critical in the claims on appeal before us. Significantly, Appellants admit that the claims are "applicable to *any* of a number of predetermined processes, including a production process in a supply chain management system. However, Appellants claim the new features of outlier correction, *not* the *application*

of outlier correction to the fields of production process or supply chain management" (Reply Br. 8-9; emphasis added). These sweeping statements unequivocally asserting that the claimed invention is directed to the features of outlier correction that are applicable to *any* of a number of predetermined processes, in our view, is the very essence of pre-emption.

The fact that the recited computation method involves a series of values over time does not change our conclusion. Limiting the method to data points acquired over time still would pre-empt essentially every method involving sequential data gathering steps.

We further note that claims 1 and 3 would fail even under the "useful, concrete, and tangible result" test articulated by *State St. Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368 (Fed. Cir. 1998) because, among other things, the determined characteristics will merely be used at some later time for forecasting purposes. As such, the characteristics determined in claims 1 and 3 merely constitute an abstraction with no practical, real-world application being claimed. *Cf. Langemyr*, at 27. Furthermore, as the court in *Comiskey* noted, the inventions in *State Street* and *AT&T Corp. v. Excel Comm., Inc.*, 172 F.3d 1352 (Fed. Cir. 1999) were patent-eligible "because they claimed practical applications and were tied to specific machines." *Comiskey*, 499 F.3d at 1377. In the claimed invention before us on appeal, however, there are no such limitations.

For the foregoing reasons, Appellants have not persuaded us of error in the Examiner's rejection of independent claims 1 and 3. Therefore, we will sustain the Examiner's rejection of those claims, and dependent claims 2 and 4-6 which were not separately argued.

Claim 7

Regarding independent claim 7, the Examiner contends that while the claims are written in means-plus-function format, the corresponding structure in the Specification can include an embodiment that is solely software (i.e., a computer program *per se*) and is therefore nonstatutory (Ans. 3, 4, 6-8).

Appellants argue that the corresponding structure in the Specification includes "structural components that may be located inside a computer, outside a computer, a combination thereof, or unrelated to a computer." This structure, Appellants contend, includes software tangibly embodied in a machine-readable storage device (App. Br. 13; Reply Br. 9).

It is undisputed that claim 7 recites a system with limitations recited in means-plus-function format. The issue before us, then, is whether Appellants have shown that the Examiner erred in finding that the structure in the Specification that corresponds to these means-plus-function limitations is not limited to statutory subject matter under § 101. For the following reasons, we find that no such error has been shown.

Means-plus-function claim language must be construed in accordance with 35 U.S.C. § 112, ¶ 6 by "look[ing] to the specification and interpret[ing] that language in light of the corresponding structure, material, or acts described therein, and equivalents thereof, to the extent that the specification provides such disclosure." *In re Donaldson Co., Inc.*, 16 F.3d 1189, 1193 (Fed. Cir. 1994) (en banc).

The Specification notes the following:

> The present techniques *can be* implemented in digital electronic circuitry, or in computer hardware, firmware, *software*, *or* in combinations

> of them. Apparatus of the invention *can be* implemented in a computer program product tangibly embodied in a machine-readable storage device for execution by a programmable processor….The invention *may be* implemented in one or several computer programs that are executable in a programmable system, which includes at least one programmable processor coupled to receive data from, and transmit data to, a storage system, at least one input device, and at least one output device, respectively….A computer *may* include one or more mass storage devices for storing data….Storage devices suitable for tangibly embodying computer program instructions and data include all forms of non-volatile memory….

(Spec. ¶ 0055; emphasis added)

As this passage indicates, the invention *can be* implemented in a number of alternative forms, (i.e., digital electronic circuitry, or in computer hardware, firmware, *software*, *or* in combinations of them). Notably, the passage unequivocally describes these implementations *in the alternative*. Thus, the software implementation is an alternative with respect to the *combination* of software and computer hardware or firmware. The clear import of this discussion is that the invention can exist solely in software. While the Specification does indicate that storage devices can tangibly embody computer program instructions as Appellants indicate (Reply Br. 9), this implementation is merely an alternative -- it does not preclude other alternatives such as the software-only implementation.

As such, the breadth of the alternatives in Paragraph 0055 of the Specification simply does not preclude a nonstatutory, software-only embodiment. Reciting descriptive material *per se* (e.g., data structures and

computer programs), however, is nonstatutory. *See In re Warmerdam*, 33 F.3d 1354, 1360-61 (Fed. Cir. 1994); *see also* MPEP § 2106.01 (noting that functional descriptive material is nonstatutory when claimed as descriptive material *per se*). Therefore, we agree with the Examiner that the structure in the Specification that corresponds to these means-plus-function limitations is not limited to statutory subject matter under § 101.[4]

For the foregoing reasons, Appellants have not persuaded us of error in the Examiner's rejection of independent claim 7. Therefore, we will sustain the Examiner's rejection of that claim.

Claim 8

Regarding independent claim 8, Appellants argue that the claim recites functional descriptive material recorded on a machine-readable medium -- subject matter that is statutory under the Interim Guidelines[5] (App. Br. 13). The Examiner, however, notes that that the claim calls for a "machine-*accessible* medium" -- not a "machine-*readable* medium" -- and could therefore be drawn to a different class of medium. In any event, the Examiner contends, the claim nonetheless effectively preempts all practical applications of the mathematical algorithm (Ans. 8-9; emphasis added).

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[4] *See* MPEP § 2106(IV)(C)(2)(2)(a) ("Claims that can be read so broadly as to include statutory and nonstatutory subject matter must be amended to limit the claim to a practical application.").

[5] *See Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility*, U.S. Patent & Trademark Office, 1300 Off. Gaz. 142 (2005), *available at* http://www.uspto.gov/web/offices/com/sol/og/2005/week47/patgupa.htm (last visited June 18, 2008).

The issue before us, then, is whether Appellants have shown that the Examiner erred in finding a "machine-accessible medium" containing instructions that, when executed, cause a machine to determine characteristic parameters as claimed is nonstatutory under § 101. For the following reasons, we find that no such error has been shown.

First, we agree with the Examiner that a "machine-accessible medium" is not a "machine-readable medium" and could therefore be drawn to a different class of medium. For example, a "machine-accessible medium" could merely be, among other things, writable and not readable. Simply put, so long as a machine can somehow *access* the medium – a capability that goes well beyond the ability for a machine to read the medium – the medium is "machine-accessible."

The plain meaning of the terms "access" and "accessible" confirms this point. The term "access" is defined, in pertinent part, as "the ability, right, or permission to approach, enter, speak with, or use; admittance…."[6] Furthermore, the term "accessible" is defined, in pertinent part, as "…easy to approach, reach, enter, speak with, or use."[7] Based on these definitions, a "machine-accessible medium" is therefore a medium that is easy for a machine to *use* – a much broader concept than a medium that is *readable*. In short, a *usable* (i.e., accessible) medium is not the same as a *readable* medium. As such, we find Appellants' argument that a machine-accessible medium is equivalent to a machine-readable medium since no practical

[6] Dictionary.com Unabridged (v 1.1), *at* http://dictionary.reference.com/browse/access (last visited June 18, 2008).
[7] Dictionary.com Unabridged (v 1.1), *at* http://dictionary.reference.com/browse/accessible (last visited June 18, 2008).

memory device exists that is accessible only by writing (Reply Br. 9) is unavailing. We find that a machine-accessible medium need not be readable, only usable.

Nevertheless, irrespective of whether a machine-accessible medium or machine-readable medium were recited in claim 8, for reasons similar to those we noted previously in connection with claims 1 and 3, claim 8 still covers (i.e., pre-empts) every substantial practical application of the abstract idea. That is, the claim is so broad that it is directed to the abstract idea itself, rather than a practical implementation of the idea. *See, e.g.*, *Ex Parte Johnson*, No. 2007-3877, 2008 WL 2195264, at *12 (BPAI May 27, 2008) (non-precedential) (holding claims 6-11 directed to "machine-accessible medium" nonstatutory under § 101 as the claims pre-empted every substantial practical application of an abstract idea); *see also Ex parte Langemyr*, No. 2008-1495, at 28 (BPAI May 28, 2008) (Informative) ("Simply placing instructions on a computer readable medium, wherein the instructions are designed to perform mere manipulations of abstract ideas, should not convert an otherwise nonstatutory method into patentable subject matter."). We therefore find claim 8 is likewise directed to nonstatutory subject matter.

For the foregoing reasons, Appellants have not persuaded us of error in the Examiner's rejection of claim 8. Therefore, we will sustain the Examiner's rejection of that claim.

Since we find that no claim on appeal recites statutory subject matter under § 101, our decision is therefore dispositive with respect to patentability of all claims on appeal. Since these claims are "barred at the

threshold by § 101[,]" *see Diehr*, 450 U.S. at 188, we need not reach the question of whether claims 1, 2, and 8 would have been obvious under § 103. *See also Comiskey*, 499 F.3d at 1368 (declining to reach obviousness rejection on appeal after concluding claims were nonstatutory under § 101); *In re Rice*, 132 F.2d 140, 141 (CCPA 1942) (finding it unnecessary to reach rejection based on prior art after concluding claims were directed to nonstatutory subject matter); *Ex parte Zhang*, No. 2007-2568, 2008 WL 281182, at *4 (BPAI Feb. 1, 2008) (non-precedential) (declining to address anticipation and obviousness rejections after finding claims were directed to nonstatutory subject matter under § 101).

DECISION

We have sustained the Examiner's rejection under § 101 with respect to all claims on appeal. Therefore, the Examiner's decision rejecting claims 1-8 under § 101 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

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