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50 U.S.P.Q.2d 1447
United States Court of Appeals,
Federal Circuit.

AT&T CORP., Plaintiff-Appellant,
v.
EXCEL COMMUNICATIONS, INC., Excel Communications Marketing, Inc., and Excel Telecommunications, Inc., Defendants-Appellees.

No. 98-1338.

April 14, 1999.

Holder of patent relating to method of indicating telephone call recipient's primary interexchange carrier (PIC) as data field in standard message record brought infringement action against competitor. The United States District Court for the District of Delaware, Sue L. Robinson, J., 1998 WL 175878, granted summary judgment for competitor, and patent holder appealed. The Court of Appeals, Plager, Circuit Judge, held that patent's method claims were within scope of patentable subject matter.
Reversed and remanded.

West Headnotes

[1] Patents k314(5)
291k314(5)

Whether asserted patent claims are invalid for failure to claim statutory subject matter is a question of law which Court of Appeals reviews without deference. 35 U.S.C.A. ¤ 101.

[2] Federal Courts k754.1
170Bk754.1

In matters of statutory interpretation, it is appellate court's responsibility independently to determine what the law is.

[3] Patents k7.14
291k7.14

Patent claim reciting method of indicating telephone call recipient's primary interexchange carrier (PIC) as data field in standard message record was "process" claim, under patent statute's definition of patentable subject matter. 35 U.S.C.A. ¤ 101.

[4] Patents k6
291k6

A mathematical formula alone, sometimes referred to as a mathematical algorithm, viewed in the abstract, is considered unpatentable subject matter. 35 U.S.C.A. ¤ 101.

[5] Patents k6
291k6

Because patent statute includes processes as a category of patentable subject matter, the judicially-defined proscription against patenting of a mathematical algorithm, to the extent such a proscription exists, is narrowly limited to mathematical algorithms in the abstract. 35 U.S.C.A. ¤ 101.

[6] Patents k5
291k5

Whether stated implicitly or explicitly, scope of patent statute's definition of patentable subject matter is the same regardless of the form, machine, or process in which a particular claim is drafted. 35 U.S.C.A. ¤ 101.

[7] Patents k7.14
291k7.14

Patent claiming process for indicating telephone call recipient's primary interexchange carrier (PIC) as data field in standard message record, which employed subscribers' and call recipients' PICs as data, applied Boolean algebra to those data to determine value of PIC indicator, and applied that value through switching and recording mechanisms to create signal useful for billing purposes, was within scope of patentable subject matter, as process applied Boolean principle to produce useful, concrete, tangible result without preempting other uses of the mathematical principle. 35 U.S.C.A. ¤ 101.

[8] Patents k6
291k6

Patent claims containing mathematical algorithms need not involve physical transformation or conversion of subject matter from one state into another to be deemed patentable subject matter. 35 U.S.C.A. ¤ 101.

Patents k328(2)
291k328(2)

5,333,184. Cited.

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Donald R. Dunner, Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., of Washington, DC, argued for defendants-appellees. With him on the brief were J. Michael Jakes and Howard A. Kwon. Of counsel on the brief were Mike McKool, Jr., Eric W. Buether, and Monte M. Bond, McKool Smith, P.C., of Dallas, Texas.

Before PLAGER, CLEVENGER, and RADER, Circuit Judges.

PLAGER, Circuit Judge.

This case asks us once again to examine the scope of section 1 of the Patent Act, 35 U.S.C. ¤ 101 (1994). The United States District Court for the District of Delaware granted summary judgment to Excel Communications, Inc., Excel Communications Marketing, Inc., and Excel Telecommunications, Inc. (collectively "Excel"), holding U.S. Patent No. 5,333,184 (the '184 patent) invalid under ¤ 101 for failure to claim statutory subject matter. See AT&T Corp. v. Excel Communications, Inc., No. CIV.A.96-434-SLR, 1998 WL 175878, at *7 (D.Del. Mar. 27, 1998). AT&T Corp. ("AT&T"), owner of the ' 184 patent, appeals. Because we find that the claimed subject matter is properly within the statutory scope of ¤ 101, we reverse the district court's judgment of invalidity on this ground and remand the case for further proceedings.

BACKGROUND

A.

The '184 patent, entitled "Call Message Recording for Telephone Systems," issued on July 26, 1994. It describes a message record for long-distance telephone calls that is enhanced by adding a primary interexchange carrier ("PIC") indicator. The addition of the indicator aids long-distance carriers in providing differential billing treatment for subscribers, depending upon whether a subscriber calls someone with the same or a different long-distance carrier.

The invention claimed in the '184 patent is designed to operate in a telecommunications system with multiple long-distance service providers. The system contains local exchange carriers ("LECs") and long-distance service (interexchange) carriers ("IXCs"). The LECs provide local telephone service and access to IXCs. Each customer has an LEC for local service and selects an IXC, such as AT & T or Excel, to be its primary long-distance service (interexchange) carrier or PIC. IXCs may own their own facilities, as does AT&T. Others, like Excel, called "resellers" or "resale carriers," contract with facility-owners to route their subscribers' calls through the facility- owners' switches and transmission lines. Some IXCs, including MCI and U.S. Sprint, have a mix of their own lines and leased lines.

*1354 The system thus involves a three-step process when a caller makes a direct-dialed (1+) long-distance telephone call: (1) after the call is transmitted over the LEC's network to a switch, and the LEC identifies the caller's PIC, the LEC automatically routes the call to the facilities used by the caller's PIC; (2) the PIC's facilities carry the call to the LEC serving the call recipient; and (3) the call recipient's LEC delivers the call over its local network to the recipient's telephone.

When a caller makes a direct-dialed long-distance telephone call, a switch (which may be a switch in the interexchange network) monitors and records data related to the call, generating an "automatic message account" ("AMA") message record. This contemporaneous message record contains fields of information such as the originating and terminating telephone numbers, and the length of time of the call. These message records are then transmitted from the switch to a message accumulation system for processing and billing.

Because the message records are stored in electronic format, they can be transmitted from one computer system to another and reformatted to ease processing of the information. Thus the carrier's AMA message subsequently is translated into the industry-standard "exchange message interface," forwarded to a rating system, and ultimately forwarded to a billing system in which the data resides until processed to generate, typically, "hard copy" bills which are mailed to subscribers.

B.

The invention of the '184 patent calls for the addition of a data field into a standard message record to indicate whether a call involves a particular PIC (the "PIC indicator"). This PIC indicator can exist in several forms, such as a code which identifies the call recipient's PIC, a flag which shows that the recipient's PIC is or is not a particular IXC, or a flag that identifies the recipient's and the caller's PICs as the same IXC. The PIC indicator therefore enables IXCs to provide differential billing for calls on the basis of the identified PIC.

The application that issued as the '184 patent was filed in 1992. The U.S. Patent and Trademark Office ("PTO") initially rejected, for reasons unrelated to ¤ 101, all forty-one of the originally filed claims. Following amendment, the claims were issued in 1994 in their present form. The '184 patent contains six independent claims, five method claims and one apparatus claim, and additional dependent claims. The PTO granted the '184 patent without questioning whether the claims were directed to statutory subject matter under ¤ 101.

AT&T in 1996 asserted ten of the method claims against Excel in this infringement suit. The independent claims at issue (claims 1, 12, 18, and 40) include the step of "generating a message record for an interexchange call between an originating subscriber and a terminating subscriber," and the step of adding a PIC indicator to

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**********ing subscriber, and including, in said message record, a primary interexchange carrier (PIC) indicator having a value which is a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers.

(Emphasis added.) Independent claims 12 and 40 add a PIC indicator that shows if a *1355 recipient's PIC is the same as the IXC over which that particular call is being made. Independent claim 18 adds a PIC indicator designed to show if the caller and the recipient subscribe to the same IXC. The dependent claims at issue add the steps of accessing an IXC's subscriber database (claims 4, 13, and 19) and billing individual calls as a function of the value of the PIC indicator (claims 6, 15, and 21).

The district court concluded that the method claims of the '184 patent implicitly recite a mathematical algorithm. See AT&T, 1998 WL 175878, at *6. The court was of the view that the only physical step in the claims involves data-gathering for the algorithm. See id. Though the court recognized that the claims require the use of switches and computers, it nevertheless concluded that use of such facilities to perform a non-substantive change in the data's format could not serve to convert non-patentable subject matter into patentable subject matter. See id. at *6-7. Thus the trial court, on summary judgment, held all of the method claims at issue invalid for failure to qualify as statutory subject matter. See id. at *7.

DISCUSSION

A.

Summary judgment is appropriate if there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. See Fed.R.Civ.P. 56(c). We review without deference a trial court's grant of summary judgment, with all justifiable factual inferences drawn in favor of

the party opposing the motion. See Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 255, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986).

[1][2] The issue on appeal, whether the asserted claims of the '184 patent are invalid for failure to claim statutory subject matter under 35 U.S.C. ¤ 101, is a question of law which we review without deference. See Arrhythmia Research Technology v. Corazonix Corp., 958 F.2d 1053, 1055-56, 22 USPQ2d 1033, 1035 (Fed.Cir.1992). In matters of statutory interpretation, it is this court's responsibility independently to determine what the law is. See Hodges v. Secretary of the Dep't of Health & Human Servs., 9 F.3d 958, 960 (Fed.Cir.1993).

B.

Our analysis of whether a claim is directed to statutory subject matter begins with the language of 35 U.S.C. ¤ 101, which reads:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The Supreme Court has construed ¤ 101 broadly, noting that Congress intended statutory subject matter to "include anything under the sun that is made by man." See Diamond v. Chakrabarty, 447 U.S. 303, 309, 100 S.Ct. 2204, 65 L.Ed.2d 144 (1980) (quoting S.Rep. No. 82-1979, at 5 (1952); H.R.Rep. No. 82-1923, at 6 (1952)); see also Diamond v. Diehr, 450 U.S. 175, 182, 101 S.Ct. 1048, 67 L.Ed.2d 155 (1981). Despite this seemingly limitless expanse, the Court has specifically identified three categories of unpatentable subject matter: "laws of nature, natural phenomena, and abstract ideas." See Diehr, 450 U.S. at 185, 101 S.Ct. 1048.

[3] In this case, the method claims at issue fall within the "process" [FN1] category of the four enumerated categories of patentable subject matter in ¤ 101. The district court held that the claims at issue, though otherwise within the terms of ¤ 101, implicitly recite a mathematical algorithm, see AT&T, 1998 WL 175878, at *6, and thus fall within the judicially created *1356 "mathematical algorithm" exception to statutory subject matter.

FN1. "Process" is defined in 35 U.S.C. ¤ 100(b) to encompass: "[a] process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."

[4] A mathematical formula alone, sometimes referred to as a mathematical algorithm, viewed in the abstract, is considered unpatentable subject matter. See Diamond v. Diehr, 450 U.S. 175, 101 S.Ct. 1048, 67 L.Ed.2d 155 (1981); Parker v. Flook, 437 U.S. 584, 98 S.Ct. 2522, 57 L.Ed.2d 451 (1978); Gottschalk v. Benson, 409 U.S. 63, 93 S.Ct. 253, 34 L.Ed.2d 273 (1972). Courts have used the terms "mathematical algorithm," "mathematical formula," and "mathematical equation," to describe types of nonstatutory mathematical subject matter without explaining whether the terms are interchangeable or different. Even assuming the words connote the same concept, there is considerable question as to exactly what the concept encompasses. See, e.g., Diehr, 450 U.S. at 186 n. 9, 101 S.Ct. 1048 ("The term 'algorithm' is subject to a variety of definitions ... [Petitioner's] definition is significantly broader than the definition this Court employed in Benson and Flook."); accord In re Schrader, 22 F.3d 290, 293 n. 5, 30 USPQ2d 1455, 1457 n. 5 (Fed.Cir.1994).

[5] This court recently pointed out that any step-by-step process, be it electronic, chemical, or mechanical, involves an "algorithm" in the broad sense of the term. See State Street Bank & Trust Co. v. Signature Fin.

Group, Inc., 149 F.3d 1368, 1374-75, 47 USPQ2d 1596, 1602 (Fed.Cir.1998), cert. denied, 525 U.S. 1093, 119 S.Ct. 851, 142 L.Ed.2d 704 (1999). Because ¤ 101 includes processes as a category of patentable subject matter, the judicially-defined proscription against patenting of a "mathematical algorithm," to the extent such a proscription still exists, is narrowly limited to mathematical algorithms in the abstract. See id.; see also Benson, 409 U.S. at 65, 93 S.Ct. 253 (describing a mathematical algorithm as a "procedure for solving a given type of mathematical problem").

Since the process of manipulation of numbers is a fundamental part of computer technology, we have had to reexamine the rules that govern the patentability of such technology. The sea-changes in both law and technology stand as a testament to the ability of law to adapt to new and innovative concepts, while remaining true to basic principles. In an earlier era, the PTO published guidelines essentially rejecting the notion that computer programs were patentable. [FN2] As the technology progressed, our predecessor court disagreed, and, overturning some of the earlier limiting principles regarding ¤ 101, announced more expansive principles formulated with computer technology in mind. [FN3] In our recent decision in State Street, this court discarded the so-called "business method" exception and reassessed the "mathematical algorithm" exception, see 149 F.3d at 1373-77, 47 USPQ2d at 1600-04, both judicially-created "exceptions" to the statutory categories of ¤ 101. As this brief review suggests, this court (and its predecessor) has struggled to make our understanding of the scope of ¤ 101 responsive to the needs of the modern world.

FN2. See, e.g., 33 Fed.Reg. 15581, 15609-10 (1968).

FN3. See In re Tarczy-Hornoch, 55 C.C.P.A. 1441, 397 F.2d 856, 158 USPQ 141 (CCPA 1968) (overruling the "function of a machine" doctrine); see also In re Bernhart, 57 C.C.P.A. 737, 417 F.2d 1395, 163 USPQ 611 (CCPA 1969) (discussing patentability of a programmed computer); In re Musgrave, 57 C.C.P.A. 1352, 431 F.2d 882, 167 USPQ 280 (CCPA 1970) (analyzing process claims encompassing computer programs). For a more detailed review of this history, with extensive citation to the secondary literature, see Justice Stevens's dissent in Diehr, 450 U.S. at 193, 101 S.Ct. 1048.

The Supreme Court has supported and enhanced this effort. In Diehr, the Court expressly limited its two earlier decisions in Flook and Benson by emphasizing that these cases did no more than confirm the "long-established principle" that laws of nature, natural phenomena, and abstract ideas are excluded from patent protection. 450 U.S. at 185, 101 S.Ct. 1048. The Diehr *1357 Court explicitly distinguished Diehr's process by pointing out that "the respondents here do not seek to patent a mathematical formula. Instead, they seek patent protection for a process of curing synthetic rubber." Id. at 187, 101 S.Ct. 1048. The Court then explained that although the process used a well-known mathematical equation, the applicants did not "pre-empt the use of that equation." Id. Thus, even though a mathematical algorithm is not patentable in isolation, a process that applies an equation to a new and useful end "is at the very least not barred at the threshold by ¤ 101." Id. at 188, 101 S.Ct. 1048. In this regard, it is particularly worthy of note that the argument for the opposite result, that "the term 'algorithm' ... is synonymous with the term 'computer program,' " id. at 219, 101 S.Ct. 1048 (Stevens, J., dissenting), and thus computer-based programs as a general proposition should not be patentable, was made forcefully in dissent by Justice Stevens; his view, however, was rejected by the Diehr majority.

As previously noted, we most recently addressed the "mathematical algorithm" exception in State Street. See 149 F.3d at 1373-75, 47 USPQ2d at 1600- 02. In State Street, this court, following the Supreme Court's guidance in Diehr, concluded that "[u]npatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting disembodied concepts or truths that are not 'useful.' ... [T]o be patentable an algorithm must be applied in a 'useful' way." Id. at 1373, 47 USPQ2d at 1601. In that case, the claimed data processing system for implementing a financial management structure satisfied the ¤ 101 inquiry because it constituted a "practical application of a mathematical algorithm, ... [by] produc[ing] 'a useful, concrete and tangible result.' " Id. at 1373, 47 USPQ2d at 1601.

The State Street formulation, that a mathematical algorithm may be an integral part of patentable subject matter such as a machine or process if the claimed invention as a whole is applied in a "useful" manner, follows the approach taken by this court en banc in In re Alappat, 33 F.3d 1526, 31 USPQ2d 1545 (Fed.Cir.1994). In Alappat, we set out our understanding of the Supreme Court's limitations on the patentability of mathematical subject matter and concluded that:

[The Court] never intended to create an overly broad, fourth category of [mathematical] subject matter excluded from ¤ 101. Rather, at the core of the Court's analysis ... lies an attempt by the Court to explain a rather straightforward concept, namely, that certain types of mathematical subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type of practical application, and thus that subject matter is not, in and of itself, entitled to patent protection.

Id. at 1543, 31 USPQ2d at 1556-57 (emphasis added). Thus, the Alappat inquiry simply requires an examination of the contested claims to see if the claimed subject matter as a whole is a disembodied mathematical concept representing nothing more than a "law of nature" or an "abstract idea," or if the mathematical concept has been reduced to some practical application rendering it "useful." Id. at 1544, 31 USPQ2d at 1557. In Alappat, we held that more than an abstract idea was claimed because the claimed invention as a whole was directed toward forming a specific machine that produced the useful, concrete, and tangible result of a smooth waveform display. See id. at 1544, 31 USPQ2d at 1557.

[6] In both Alappat and State Street, the claim was for a machine that achieved certain results. In the case before us, because Excel does not own or operate the facilities over which its calls are placed, AT&T did not charge Excel with infringement of its apparatus claims, but limited its infringement charge to the specified method or process claims. Whether stated implicitly or explicitly, we consider the scope of ¤ 101 to be the same regardless of the form--machine or process--in which a particular claim is drafted. See, e.g., In *1358 re Alappat, 33 F.3d at 1581, 31 USPQ2d at 1589 (Rader, J., concurring) ("Judge Rich, with whom I fully concur, reads Alappat's application as claiming a machine. In fact, whether the invention is a process or a machine is irrelevant. The language of the Patent Act itself, as well as Supreme Court rulings, clarifies that Alappat's invention fits comfortably within 35 U.S.C. ¤ 101 whether viewed as a process or a machine."); State Street, 149 F.3d at 1372, 47 USPQ2d at 1600 ("[F]or the purposes of a ¤ 101 analysis, it is of little relevance whether claim 1 is directed to a 'machine' or a 'process,'...."). Furthermore, the Supreme Court's decisions in Diehr, Benson, and Flook, all of which involved method (i.e., process) claims, have provided and supported the principles which we apply to both machine--and process-type claims. Thus, we are comfortable in applying our reasoning in Alappat and State Street to the method claims at issue in this case.

C.

[7] In light of this review of the current understanding of the "mathematical algorithm" exception, we turn now to the arguments of the parties in support of and in opposition to the trial court's judgment. We note that, at the time the trial court made its decision, that court did not have the benefit of this court's explication in State Street of the mathematical algorithm issue.

As previously explained, AT&T's claimed process employs subscribers' and call recipients' PICs as data, applies Boolean algebra to those data to determine the value of the PIC indicator, and applies that value through switching and recording mechanisms to create a signal useful for billing purposes. In State Street, we held that the processing system there was patentable subject matter because the system takes data representing discrete dollar amounts through a series of mathematical calculations to determine a final share price--a useful, concrete, and tangible result. See 149 F.3d at 1373, 47 USPQ2d at 1601.

In this case, Excel argues, correctly, that the PIC indicator value is derived using a simple mathematical principle (p and q). But that is not determinative because AT&T does not claim the Boolean principle as such or attempt to forestall its use in any other application. It is clear from the written description of the '184 patent that AT&T is only claiming a process that uses the Boolean principle in order to determine the value of the PIC indicator. The PIC indicator represents information about the call recipient's PIC, a useful, non-abstract result that facilitates differential billing of long-distance calls made by an IXC's subscriber. Because the claimed process applies the Boolean principle to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle, on its face the claimed process comfortably falls within the scope of ¤ 101. See Arrhythmia Research Technology, Inc. v. Corazonix Corp., 958 F.2d 1053, 1060, 22 USPQ2d 1033, 1039 (Fed.Cir.1992) ("That the product is numerical is not a criterion of whether the claim is directed to statutory subject matter.").

[8] Excel argues that method claims containing mathematical algorithms are patentable subject matter only if there is a "physical transformation" or conversion of subject matter from one state into another. The physical transformation language appears in Diehr, see 450 U.S. at 184, 101 S.Ct. 1048 ("That respondents' claims involve the transformation of an article, in this case raw, uncured synthetic rubber, into a different state or thing cannot be disputed."), and has been echoed by this court in Schrader, 22 F.3d at 294, 30 USPQ2d at 1458 ("Therefore, we do not find in the claim any kind of data transformation.").

The notion of "physical transformation" can be misunderstood. In the first place, it is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application. As the Supreme Court itself noted, "*1359 when [a claimed invention] 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." Diehr, 450 U.S. at 192, 101 S.Ct. 1048 (emphasis added). The "e.g." signal denotes an example, not an exclusive requirement.

This understanding of transformation is consistent with our earlier decision in Arrhythmia, 958 F.2d 1053, 22 USPQ2d 1033 (Fed.Cir.1992). Arrhythmia's process claims included various mathematical formulae to analyze electrocardiograph signals to determine a specified heart activity. See id. at 1059, 22 USPQ2d at 1037-38. The Arrhythmia court reasoned that the method claims qualified as statutory subject matter by noting that the steps transformed physical, electrical signals from one form into another form--a

number representing a signal related to the patient's heart activity, a non-abstract output. See id., 958 F.2d at 1059, 22 USPQ2d at 1038. The finding that the claimed process "transformed" data from one "form" to another simply confirmed that Arrhythmia's method claims satisfied ¤ 101 because the mathematical algorithm included within the process was applied to produce a number which had specific meaning--a useful, concrete, tangible result--not a mathematical abstraction. See id. at 1060, 22 USPQ2d at 1039.

Excel also contends that because the process claims at issue lack physical limitations set forth in the patent, the claims are not patentable subject matter. This argument reflects a misunderstanding of our case law. The cases cited by Excel for this proposition involved machine claims written in means-plus-function language. See, e.g., State Street, 149 F.3d at 1371, 47 USPQ2d at 1599; Alappat, 33 F.3d at 1541, 31 USPQ2d at 1554-55. Apparatus claims written in this manner require supporting structure in the written description that corresponds to the claimed "means" elements. See 35 U.S.C. ¤ 112, para. 6 (1994). Since the claims at issue in this case are directed to a process in the first instance, a structural inquiry is unnecessary.

The argument that physical limitations are necessary may also stem from the second part of the Freeman-Walter-Abele test, [FN4] an earlier test which has been used to identify claims thought to involve unpatentable mathematical algorithms. That second part was said to inquire "whether the claim is directed to a mathematical algorithm that is not applied to or limited by physical elements." Arrhythmia, 958 F.2d at 1058, 22 USPQ2d at 1037. Although our en banc Alappat decision called this test "not an improper analysis," we then pointed out that "the ultimate issue always has been whether the claim as a whole is drawn to statutory subject matter." 33 F.3d at 1543 n. 21, 31 USPQ2d at 1557 n. 21. Furthermore, our recent State Street decision questioned the continuing viability of the Freeman-Walter- Abele test, noting that, "[a]fter Diehr and Chakrabarty, the Freeman-Walter-Abele test has little, if any, applicability to determining the presence of statutory subject matter." 149 F.3d at 1374, 47 USPQ2d at 1601. Whatever may be left of the earlier test, if anything, this type of physical limitations analysis seems of little value because "after Diehr and Alappat, the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers, and storing numbers, in and of itself, would not render it nonstatutory subject matter, unless, of course, its operation does not produce a 'useful, concrete and tangible result.' " Id. at 1374, 47 USPQ2d at 1602 (quoting Alappat, 33 F.3d at 1544, 31 USPQ2d at 1557).

FN4. See In re Freeman, 573 F.2d 1237, 197 USPQ 464 (CCPA 1978), as modified by In re Walter, 618 F.2d 758, 205 USPQ 397(CCPA 1980), and In re Abele, 648 F.2d 902, 214 USPQ 682 (CCPA 1982).

Because we focus on the inquiry deemed "the ultimate issue" by Alappat, rather than on the physical limitations inquiry of *1360 the Freeman-Walter-Abele test, we find the cases cited by Excel in support of its position to be inapposite. For example, in In re Grams, the court applied the Freeman-Walter-Abele test and concluded that the only physical step in the claimed process involved data-gathering for the algorithm; thus, the claims were held to be directed to unpatentable subject matter. See 888 F.2d 835, 839, 12 USPQ2d 1824, 1829 (Fed.Cir.1989). In contrast, our inquiry here focuses on whether the mathematical algorithm is applied in a practical manner to produce a useful result. In re Grams is unhelpful because the panel in that case did not ascertain if the end result of the claimed process was useful, concrete, and tangible.

Similarly, the court in In re Schrader relied upon the Freeman- Walter-Abele test for its analysis of the method claim involved. The court found neither a physical transformation nor any physical step in the claimed process aside from the entering of data into a record. See 22 F.3d at 294, 30 USPQ2d at 1458. The Schrader court likened the data-recording step to that of data-gathering and held that the claim was properly rejected as failing to define patentable subject matter. See id. at 294, 296, 30 USPQ2d at 1458-59. The focus of the court in Schrader was not on whether the mathematical algorithm was applied in a practical manner since it ended its inquiry before looking to see if a useful, concrete, tangible result ensued. Thus, in light of our recent understanding of the issue, the Schrader court's analysis is as unhelpful as that of In re Grams.

Finally, the decision in In re Warmerdam, 33 F.3d 1354, 31 USPQ2d 1754 (Fed.Cir.1994) is not to the contrary. There the court recognized the difficulty in knowing exactly what a mathematical algorithm is, "which makes rather dicey the determination of whether the claim as a whole is no more than that." Id. at 1359, 31 USPQ2d at 1758. Warmerdam's claims 1-4 encompassed a method for controlling the motion of objects and machines to avoid collision with other moving or fixed objects by generating bubble hierarchies through the use of a particular mathematical procedure. See id. at 1356, 31 USPQ2d at 1755-56. The court found that the claimed process did nothing more than manipulate basic mathematical constructs and concluded that "taking several abstract ideas and manipulating them together adds nothing to the basic equation"; hence, the court held that the claims were properly rejected under ¤ 101. Id. at 1360, 31 USPQ2d at 1759. Whether one agrees with the court's conclusion on the facts, the holding of the case is a straightforward application of the basic principle that mere laws of nature, natural phenomena, and abstract ideas are not within the categories of inventions or discoveries that may be patented under ¤ 101.

D.

In his dissent in Diehr, Justice Stevens noted two concerns regarding the ¤ 101 issue, and to which, in his view, federal judges have a duty to respond: First, the cases considering the patentability of program-related inventions do not establish rules that enable a conscientious patent lawyer to determine with a fair degree of accuracy which, if any, program-related inventions will be patentable. Second, the inclusion of the ambiguous concept of an "algorithm" within the "law of nature" category of unpatentable subject matter has given rise to the concern that almost any process might be so described and therefore held unpatentable.

Diehr, 450 U.S. at 219, 101 S.Ct. 1048 (Stevens, J., dissenting).

Despite the almost twenty years since Justice Stevens wrote, these concerns remain important. His solution was to declare all computer-based programming unpatentable. That has not been the course the law has taken. Rather, it is now clear that computer-based programming constitutes patentable subject matter so long as the basic requirements of ¤ 101 are met. Justice Stevens's concerns can be addressed within that framework.

*1361 His first concern, that the rules are not sufficiently clear to enable reasonable prediction of outcomes, should be less of a concern today in light of the refocusing of the ¤ 101 issue that Alappat and State Street have provided. His second concern, that the ambiguous concept of "algorithm" could be used to make any process unpatentable, can be laid to rest once the focus is understood to be not on whether there is a mathematical algorithm at work, but on whether the algorithm-containing invention, as a whole, produces a tangible, useful, result.

In light of the above, and consistent with the clearer understanding that our more recent cases have provided, we conclude that the district court did

not apply the proper analysis to the method claims at issue. Furthermore, had the court applied the proper analysis to the stated claims, the court would have concluded that all the claims asserted fall comfortably within the broad scope of patentable subject matter under ¤ 101. Accordingly, we hold as a matter of law that Excel was not entitled to the grant of summary judgment of invalidity of the '184 patent under ¤ 101.

Since the case must be returned to the trial court for further proceedings, and to avoid any possible misunderstandings as to the scope of our decision, we note that the ultimate validity of these claims depends upon their satisfying the other requirements for patentability such as those set forth in 35 U.S.C. ¤¤ 102, 103, and 112. Thus, on remand, those questions, as well as any others the parties may properly raise, remain for disposition.

CONCLUSION

The district court's summary judgment of invalidity is reversed, and the case is remanded for further proceedings consistent with this opinion.

REVERSED & REMANDED.

172 F.3d 1352, 50 U.S.P.Q.2d 1447

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