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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte PAUL RAYMOND SCHEID, COLIN KARSTEN, WILLIAM J. WELCH, and ANUPAM BHARGAVA

Appeal 2017-002333
Application 13/003,886
Technology Center 3600

Before CAROLYN D. THOMAS, KARA L. SZPONDOWSKI, and PHILLIP A. BENNETT, *Administrative Patent Judges*.

SZPONDOWSKI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants[1] appeal under 35 U.S.C. § 134(a) from the Examiner's Final Rejection of claims 1–7 and 9–17, constituting all claims pending in the current application. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] According to Appellants, the real party in interest is United Technologies Corporation. *See* App. Br. 1.

STATEMENT OF THE CASE

Appellants' invention is directed to a method of identifying CO_2 reduction and obtaining carbon credits. Spec. ¶¶ 6, 14. Claim 1, reproduced below, is representative of the claimed subject matter:

> 1. A method of certifying a reduction in carbon emission due to a cleaning of a gas turbine engine, comprising the steps of:
>
> utilizing a computer to determine a fuel use reduction due to the cleaning of the gas turbine engine,
>
> modeling the reduction in carbon emission as a function of the fuel use reduction due to the cleaning; and
>
> sending information relative to the carbon emission reduction to a certifying agency.

REJECTIONS

Claims 1–7 and 9–17 stand rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1, 2, 4–9, 11, 13, and 15 stand rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over the combination of Ivchenko et al. (US 2008/0015975 A1; published Jan. 17, 2008) ("Ivchenko"), Asplund et al. (US 2006/0048796 A1; published Mar. 9, 2006) ("Asplund"), and van Soestbergen et al. (US 7,426,489 B2; issued Sept. 16, 2008) ("van Soestbergen").

Claims 3 and 10 stand rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over the combination of Ivchenko, Asplund, van Soestbergen, and Zimmerman (US 2004/0158478 A1; published Aug. 12, 2004).

Claims 12 and 16 stand rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over the combination of Ivchenko, Asplund, van Soestbergen, and The Boeing Company, *Fuel Consumption Analysis of the Boeing 767-200ER and Airbus 330-200 in Commercial Service when operated at High Take-off Gross Weight*, 2–9 (Nov. 12, 2007) (available online at https://www.defenseindustrydaily.com/files/Boeing_KC-X_Fue I_Costs_ Report_2007-11.pdf) (prepared by Conklin & de Decker Aviation Info. for Boeing Corp.) (last visited May 21, 2018) ("Boeing").

Claims 14 and 17 stand rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over the combination of Ivchenko, Asplund, van Soestbergen, and Kristin Rypdal, *Aircraft Emissions*, *in* GOOD PRACTICE GUIDANCE AND UNCERTAINTY MANAGEMENT IN NATIONAL GREENHOUSE GAS INVENTORIES, 93–102 (2002) ("Rypdal").

ANALYSIS

§ 101 Rejection

Alice Corp. Pty. Ltd. v. CLS Bank International, 134 S. Ct. 2347 (2014) identifies a two-step framework for determining whether claimed subject matter is judicially-excepted from patent eligibility under 35 U.S.C. § 101. In the first step, "[w]e must first determine whether the claims at issue are directed to a patent-ineligible concept." *Alice*, 134 S. Ct. at 2355.

The Examiner determines the steps of "determining and modeling carbon emission reduction as a function of fuel use reduction based upon the cleaning of an engine is considered to be an abstract idea because it is based upon mathematical calculations and formulas" or "because it is an idea of

itself . . . [and] can be done via a purely mental process." Final Act. 9, *see also* Final Act. 11.

Appellants argue the claims are not directed to "claiming a mathematical formula on its own or an abstract idea" because the claims "recite concrete steps," such as the "*determining* . . ." and "*sending* . . ." steps. App. Br. 3. Appellants further argue "the steps of 'modeling' and 'determining' are not abstract concepts like the risk hedging claims of *Bilski* or the intermediated settlement claims of *Alice*." App. Br. 4.

We are not persuaded. The claims are reasonably directed to an abstract idea because they relate to the mathematical analysis of data. The Specification expressly describes the invention in terms of data analysis and calculations. *See, e.g.*, Spec. ¶¶ 16, 17, 36, 37, 40. Appellants even state "the claims are directed to novel and non-obvious techniques for *analyzing information*." Reply Br. 2. Data analysis and algorithms are abstract ideas. *See, e.g.*, *Alice*, 134 S. Ct. at 2355; *Parker v. Flook*, 437 U.S. 584, 589, 594–95 (1978) ("Reasoning that an algorithm, or mathematical formula, is like a law of nature, Benson applied the established rule that a law of nature cannot be the subject of a patent"); *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972). Put concisely, "[w]ithout additional limitations, a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible." *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014). Sending information relative to the carbon emission reduction to a certifying agency is merely insignificant post-solution activity. *See Parker*, 437 U.S. at 592.

Moreover, other than the limitation "utilizing a computer to determine a fuel use reduction due to the cleaning of the gas turbine engine," independent method claims 1 and 5 do not recite use of a computer for performing of any of the remaining steps. The Federal Circuit has held that if a method can be performed by human though alone, or by a human using pen and paper, it is merely an abstract idea and is not patent-eligible under § 101. *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1373 (Fed. Cir. 2011) ("[A] method that can be performed by human thought alone is merely an abstract idea and is not patent-eligible under § 101"). Additionally, mental processes or activities capable of being performed by a person, e.g., making determinations, modeling, sending information, selling a carbon credit, remain unpatentable even when automated through the use of a computer (e.g., as in "utilizing a computer" in independent claims 1 and 5 and generally in independent claim 7) to reduce the burden on the user of what once could have been done with pen and paper. *See CyberSource Corp.*, 654 F.3d at 1375 ("That purely mental processes can be unpatentable, even when performed by a computer, was precisely the holding of the Supreme Court in *Gottschalk v. Benson*").

Nor are we persuaded by Appellants' arguments that the claims are analogous to those in *Enfish*. *See* App. Br. 4. The claims in *Enfish* were directed to a specific improvement in the way computers operate, embodied in a self-referential database table, and recited technical details for a software component. 822 F.3d at 1338–39. Thus, in *Enfish*, the claims focused on an improvement in computer capabilities, specifically, how computers could carry out basic functions of storage and retrieval of data, not on advances in uses to which existing computer capabilities could be

applied. *Enfish*, 822 F.3d at 1335–36. By contrast, the claims here focus on no such improvement to computer technology, and, as discussed above, do not, in some cases, even require use of a computer. Rather, the claims instead focus on an abstract idea that, at most, uses generic computing elements. *See Electric Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016) (explaining that claims directed to computerized collecting, analyzing, and displaying information were different from the claims in *Enfish*: "the focus of the claims is not on such an improvement in computers as tools, but on certain independently abstract ideas that use computers as tools").

Appellants further argue there is no concern "that the present claims attempt to preclude all uses of any kind of modeling or computation, or that a mathematical equation would be 'tied up'." App. Br. 4. This argument is not persuasive. "The Supreme Court has made clear that the principle of preemption is the basis for the judicial exceptions to patentability" and "[f]or this reason, questions on preemption are inherent in and resolved by the § 101 analysis." *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) (citing *Alice Corp.*, 134 S. Ct. at 2354). "[P]reemption may signal patent ineligible subject matter, [but] the absence of complete preemption does not demonstrate patent eligibility." *Id.*

In the second step of the *Alice* analysis, we "consider the elements of each claim both individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Alice*, 134 S. Ct. at 2355 (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 79, 78 (2012)). In other words, the second step is to "search for an 'inventive concept'—*i.e.*,

an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" *Id.* (alteration in original) (quoting *Mayo*, 566 U.S. at 72–73).

The Examiner determines the structural elements of the claim (use of a computer), when taken in combination with the functional element of sending information relative to the carbon emission reduction to a certifying agency, do not offer "significantly more" than the abstract idea itself. Final Act. 9–11. The Examiner determines "the claims require no more than a generic computer to perform generic computer functions that are well-understood, routine and conventional activities previously known to the industry." Final Act. 10–11.

Appellants argue "utilizing a computer to determine a fuel use reduction due to the cleaning of the gas turbine engine" is a "'meaningful limitation' because i[t] affects the scope of the claims." App. Br. 5. According to Appellants, this limitation "adds a specific limitation that is not well-understood, routine, or conventional activity (i.e., determining a fuel use reduction *due to the cleaning of the gas turbine engine*, which . . . is not known in the prior art)" that can "be characterized as an 'unconventional step' that confines the claim to a particular useful application (i.e., determine a fuel use reduction *due to the cleaning of the gas turbine engine*)." App. Br. 6.

Although the second step in the *Mayo/Alice* framework is termed a search for an "inventive concept," the analysis is not an evaluation of novelty or nonobviousness, but whether the implementation of the abstract idea involves "more than [the] performance of 'well-understood, routine,

[and] conventional activities previously known to the industry."' *Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1347–48 (Fed. Cir. 2014) (quoting *Alice*, 134 S. Ct. at 2359). A novel and non-obvious claim directed to a purely abstract idea is, nonetheless, patent-ineligible. *See Mayo*, 566 U.S. at 90; *see also Diamond v. Diehr*, 450 U.S. 175, 188–89 (1981) ("The 'novelty' of any element or steps in a process, or even of the process itself, is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories of possibly patentable subject matter").

As discussed above, the claims are capable of being performed in the human mind, or by a human using pen and paper. The Federal Circuit has "consistently 'refused to find processes patentable when they merely claimed a mental process standing alone and untied to another category of statutory subject matter[,] even when a practical application was claimed.'" *CyberSource Corp*, 654 F.3d at 1372 (quoting *In re Comiskey*, 554 F.3d 967, 980 (Fed. Cir. 2009)).

Moreover, we find no indication in the record, nor do Appellants direct us to any indication, that the operations recited in the claims (particularly claim 7) require any specialized computer hardware or other inventive computer components, invoke any assertedly inventive programming, or that the claimed invention is implemented using other than generic computer components to perform the claimed method steps. To the contrary, Appellants' Specification describes the use of generic computer components. *See* Spec. ¶¶ 55–59. The claimed steps involve performing mathematical calculations (determining and modeling) and transmitting information (sending), e.g., generic computer functions. *See buySAFE, Inc.*

v. Google, Inc., 765 F.3d 1350, 1355 (Fed. Cir. 2014) ("That a computer receives and sends the information over a network—with no further specification—is not even arguably inventive"); *SiRF Tech., Inc. v. Int'l Trade Comm'n*, 601 F.3d 1319, 1333 (Fed. Cir. 2010) ("In order for the addition of a machine to impose a meaningful limit on the scope of a claim, it must play a significant part in permitting the claimed method to be performed, rather than function solely as an obvious mechanism for permitting a solution to be achieve more quickly, i.e., through the utilization of a computer for performing calculations"); *Bancorp Servs., L.L.C. v. Sun Life Assur. Co. of Canada (U.S.)*, 687 F.3d 1266, 1278 (Fed. Cir. 2012) ("The computer required by some of Bancorp's claims is employed only for its most basic function, the performance of repetitive calculations, and as such does not impose meaningful limits on the scope of those claims").

Accordingly, we are not persuaded the Examiner erred in rejecting claims 1–7 and 9–17 under 35 U.S.C. § 101, so we, therefore, sustain the Examiner's rejections.

§ 103(a) Rejections

Issue: Did the Examiner err in finding the combination of Ivchenko, Asplund, and van Soestbergen teaches or suggests "modeling the reduction in carbon emission as a function of the fuel use reduction due to the cleaning," as recited in independent claim 1 and commensurately recited in independent claims 5 and 7?

The Examiner relies on the combination of Ivchenko and Asplund to teach or suggest the disputed limitation. Final Act. 13–15 (citing Ivchenko ¶¶ 29, 62, Fig. 6, Asplund ¶¶ 8, 18, 24). Specifically, the Examiner relies on

Ivchenko to teach "modeling the reduction in carbon emission as a function of," and Asplund to teach or suggest "fuel use reduction due to the cleaning." Final Act. 13. The Examiner substitutes the feature of the gas engine cleaning step of Asplund for the feature of any of the "emission reduction technologies" in Ivchenko's method of calculating emission reduction credits. Final Act. 14–15.

Appellants argue "Ivchenko only discloses inputting a baseline emissions amount and a modified emissions amount into a computer and processing the amounts to determine a number of mobile emissions reduction credits" and does not teach "creating any kind of relationship between a reduction in carbon emission and any improvement in engine operation." App. Br. 7. According to Appellants, "[m]odifying Ivchenko with Asplund would not arrive at the claimed subject matter because neither reference discloses creating a relationship between engine cleaning (or any improvement in engine operation) and fuel use reduction due to that cleaning or improvement." App. Br. 7. Appellants argue, "Ivchenko does not model the *emissions* as a function of anything; Ivchenko models *emission reduction credits* as a function of emissions." App. Br. 8.

We are not persuaded by Appellants' arguments and agree with the Examiner's findings and conclusions. Final Act. 12–42; Ans. 12–15. Ivchenko describes, *inter alia*, identifying an emissions reduction technology, taking initial measurements to develop a baseline emissions amount, applying the emissions reduction technology, taking second measurement to develop a modified emissions amount, quantifying the emissions reduction produced by the emissions reduction technology, and converting the mobile emissions reduction into a tradable commodity.

Ivchenko ¶ 24, Fig. 6. Ivchenko, therefore, describes a relationship between the application of the emissions reduction technology and the emissions reduction. Ivchenko ¶ 24, Fig. 6. Although Ivchenko teaches that "carbon dioxide emissions and energy uses are highly correlated" (Ivchenko ¶ 3), Ivchenko does not teach or suggest "fuel use reduction due to the cleaning [of the gas turbine engine]." Instead, Ivchenko describes emissions reduction technologies such as alternative fuels, vehicle repairs, vehicle replacements, vehicle retrofits, and hybrid engines. Ivchenko ¶ 27. Asplund, however, describes cleaning a gas turbine engine to "reduce . . . negative effects of the fouling effects to aero engine performance such as increased fuel consumption, reduced engine life, increased emissions of carbon dioxide and NOx." Asplund ¶ 18; *see also* Asplund ¶ 8. In other words, Asplund teaches the relationship between cleaning the gas turbine engine and both fuel use reduction and reduced carbon dioxide emission. *See also* Asplund ¶ 5. The Examiner substitutes the teachings in Asplund of cleaning the gas turbine engine for any of the disclosed emissions reduction technologies in Ivchenko. Ans. 13–15. We agree with the Examiner's findings that the only difference in Ivchenko's disclosure from that of the claimed method is the lack of gas turbine engine cleaning as a disclosed emissions reduction technology; however, gas turbine engine cleaning used to reduce carbon emissions was known in the prior art and disclosed in Asplund. Ans. 14–15.

Accordingly, we are not persuaded the Examiner erred. We, therefore, sustain the Examiner's 35 U.S.C. § 103(a) rejection of independent claims 1, 5, and 7. For the same reasons, we sustain the Examiner's 35 U.S.C. § 103(a) rejections of dependent claims 2–4, 6, and

9–17, which were not separately argued.

DECISION

The Examiner's 35 U.S.C. § 101 rejection of claims 1–7 and 9–17 is affirmed.

The Examiner's 35 U.S.C. § 103(a) rejections of claims 1–7 and 9–17 are 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