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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ANTOINE GAUTIER and DAVID DUREY

Appeal 2015-007436
Application 12/531,605
Technology Center 3600

Before THOMAS F. SMEGAL, LISA M. GUIJT, and ERIC C. JESCHKE,
Administrative Patent Judges.

JESCHKE, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Antoine Gautier and David Durey (“Appellants”)¹ seek review under 35 U.S.C. § 134(a) of the Examiner’s decision, as set forth in the Final Office Action dated September 16, 2014 (“Final Act.”), rejecting claims 9–11, 16, and 18. We have jurisdiction under 35 U.S.C. § 6(b).

We *affirm* and enter a *new ground of rejection* pursuant to our authority under 37 C.F.R. § 41.50(b).

¹ Appellants identify AREVA NP as the real party in interest. Appeal Br. 2.

BACKGROUND

The disclosed subject matter “relates to a method for determining the three-dimensional power distribution of the core of a nuclear reactor.” Spec. 1, ll. 9–11. Claims 9, 16, and 18 are independent. Claim 9 is reproduced below, with bracketed letters added to identify each clause:

9. A method for determining a three-dimensional power distribution of a core of a nuclear reactor implemented by a programmed device including a processor and a non-transitory computer readable storage medium, the core including a plurality of fuel assemblies, by using a set of neutron flux measurement detectors disposed outside a vessel of the reactor and a set of probes measuring a temperature of a coolant at an outlet of the fuel assemblies, the method comprising the following steps:

[a] determining, by the processor, a first three-dimensional power distribution by using a neutronic calculation code instantaneously solving a diffusion equation and updating an isotopic balance of the core during fuel depletion, from values of reactor operation parameters, a neutronic calculation being carried out during a time step that is less than one minute;

[b] monitoring measurements generated by the neutron flux measurement detectors;

[c] determining, by the processor, a new three-dimensional power distribution by adjusting the first three-dimensional power distribution with the measurements issued by the neutron flux measurement detectors disposed outside the reactor vessel and the temperature measurement probes; and

[*d.i*] continuously controlling, by the processor, the neutronic calculation, the control comprising the following steps:

[*d.ii*] calculating, at time step t_i , a current three-dimensional power distribution of the core from values of parameters characterizing a current operation of the reactor,

[*d.iii*] calculating, at time step t_i , a new three-dimensional power distribution after adjusting at least one parameter characterizing the current operation of the reactor to minimize a discrepancy between a calculation and a measurement of an axial power imbalance averaged over a set of assemblies at a periphery of the core, and

[*d.iv*] using the new power distribution issued from the previous calculation as an initial condition of the neutronic calculation at a following time step t_{i+1} .

REJECTION²

Claims 9–11, 16, and 18 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Impink (US 4,774,049, issued Sept. 27, 1988) and Lin (US 5,225,147, issued July 6, 1993).

² The Examiner rejected claims 9–11, 16, and 18 under 35 U.S.C. § 102(b) as anticipated by Impink (US 4,774,049, issued Sept. 27, 1988). *See* Final Act. 3–7. In the Answer, the Examiner withdraws this rejection. *See* Ans. 7.

DISCUSSION

Appellants assert the patentability of the three independent claims—claims 9, 16, and 18—based on the same arguments and do not provide separate arguments for any dependent claims. Appeal Br. 6–12.³ We select claim 9 as representative, with the remaining claims standing or falling with claim 9. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2014).

For claim 9, the Examiner relied on Impink for certain limitations but stated that “Impink does not explicitly disclose the time interval for successive neutronic calculations nor the use of current reactor conditions to minimize discrepancies between calculated and actual values.” Final Act. 9. The Examiner found, however, that Lin discloses these aspects because:

Lin teaches successive calculations at time intervals of less than 0.25 seconds (column 2, line 63) and “providing time-dependent neutron diffusion equations coupled to delayed neutron precursor concentrations . . . sensing the monitored parameters, and determining the core neutronic parameters in response to the sense parameters and the provided two group neutron diffusion equations in constant time steps” (column 2 lines 52–63).

Id. According to the Examiner, “[o]ne of ordinary skill in the art at the time of the invention would have been motivated to combine the successive, normalized calculations of Lin with the method of Impink to determine core neutronics in response to rapid transient conditions in a real-time environment.” *Id.* at 9–10 (citing Lin, col. 2, ll. 15–17).

³ Any citation to pages 5 through 12 of the Appeal Brief refers to the substitute argument section filed on March 16, 2015. Citations to any other page of the Appeal Brief refer to the version filed on March 13, 2015.

Clause a of Claim 9

Appellants argue that “although Impink further discloses a step of determining a first power distribution,” as recited in clause *a*, “Impink does not disclose or suggest that the first power distribution is obtained by using a neutronic calculation code solving a diffusion equation and updating an isotopic balance of the core during fuel depletion, from values of reactor operation parameters,” as further recited in clause *a*. Appeal Br. 7. Appellants state that “[t]he Examiner has previously cited to a variety of passages in Impink that purportedly disclose this feature.” *Id.* Below, we address various limitations in clause *a* and the aspects of the prior art relied on by the Examiner.

First, we address the limitation “determining, by the processor, a first three-dimensional power distribution by using a neutronic calculation code instantaneously.” In the Office Action, the Examiner quoted this language and stated “(real time, [Impink,] column 3, line 66 though column 4, line 2)”. Final Act. 8–9. Appellants argue that “this disclosure of Impink has no relevance nor does this disclosure equate to a neutronic calculation code being used, much less instantaneously.” Appeal Br. 7. Appellants continue:

In contrast, this disclosure of Impink only relates to the method of Impink being implemented on-line and in real time in which the on-line implementation is carried out by the measurements provided by thermocouples. [Impink,] col. 9, ll. 65–66. That is, no neutronic calculation is being used in Impink.

Id.

The Examiner responds that “although Impink does not explicitly recite [‘]neutronic calculation code,’ Impink discloses a computer-based system that calculates a neutron flux map of a reactor.” Ans. 7. According to the Examiner, “[t]he computer [of Impink] necessarily contains code and

because the computer carries out a neutronic calculation, i.e. the generating a power distribution map from measured values, the code in the computer in Impink can be said to be a ‘neutronic calculation code.’” *Id.* (citing Impink col. 8, ll. 18–28 and 53+).

We are not apprised of error in the finding that the relied-upon aspects of Impink (*see* Final Act. 8–9; Ans. 7) disclose the limitation at issue. With this argument, Appellants recite aspects of the limitation at issue and assert that Impink does not disclose that limitation, but do not show error in the Examiner’s findings. *See* 37 C.F.R. § 41.37(c)(1)(iv) (“A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim.”); *see also In re Lovin*, 652 F.3d 1349, 1356–57 (Fed. Cir. 2011) (holding that “the Board reasonably interpreted Rule 41.37 to require more substantive arguments in an appeal brief than a mere recitation of the claim elements and a naked assertion that the corresponding elements were not found in the prior art”).

Second, we turn to the limitation “solving a diffusion equation and updating an isotopic balance of the core during fuel depletion, from values of reactor operation parameters” in clause *a*. In the Office Action, the Examiner quoted this language and cited column 4, line 60 to column 5, line 3 of Impink. *See* Final Act. 9. Appellants argue that “this portion of Impink does not mean that a neutronic calculation code is used by solving a diffusion equation and updating an isotopic balance of the core during fuel depletion from values of reactor operation parameters.” Appeal Br. 7.

The Examiner responds that “although Impink does not explicitly recite ‘solving a diffusion equation,’ such a calculation is inherent to the calculation of a three-dimensional power distribution map as in Impink.”

Ans. 7. The Examiner then quotes column 2, line 35 to 39 of Impink and states that “[a] skilled nuclear artisan would readily recognize that Impink’s disclosure of a ‘three dimensional core power distribution’ is the result of solving the neutron transport equation that is derived from the Boltzmann transport equation” and that “[i]n the neutronic context, the term ‘transport’ is equivalent to diffusion.” *Id.* at 7–8. According to the Examiner, “Impink’s disclosure of ‘three dimensional core power distribution’ must necessarily be a disclosure of the claimed ‘solving a diffusion equation.’” *Id.* at 8.

We are not apprised of error in the finding that the relied-upon aspects of Impink (*see* Final Act. 9; Ans. 7–8) disclose the limitation at issue. With this argument, Appellants recite aspects of the limitation at issue and assert that Impink does not disclose that limitation, but do not show error in the Examiner’s findings. *See* 37 C.F.R. § 41.37(c)(1)(iv); *see also Lovin*, 652 F.3d at 1356–57.

The Examiner also addressed the limitation at issue in the Response to Arguments section of the Office Action, stating “although Impink does not explicitly recite ‘solving a diffusion equation,’ such a calculation is inherent to the calculation of a power distribution map as in Impink.” Final Act. 2. The Examiner then quoted column 2, lines 35 to 39 of Impink and column 8, lines 31 to 35 of U.S. Patent No. 5,024,801 (“Impink II”⁴) and concluded, “[t]herefore, Examiner submits that the conventional methodology for determining reactor power distribution disclosed by [Impink] solves the neutron diffusion equation as disclosed in [Impink II].” *Id.* at 2–3.

⁴ Like Appellants, we will refer to this patent as “Impink II.” *See, e.g.,* Appeal Br. 8.

Addressing the Examiner's position, Appellants state that the Examiner "has further provided another citation from Impink and provides [Impink II] to provide support that this feature [in clause *a*] of claim 9 is a common methodology that has already been employed such as in the prior art." Appeal Br. 8 (citing Final Act. 2). Appellants contend that "there is no connection from the 'common use' cited in Impink to the neutron transport diffusion algorithms of Impink II." *Id.*; *see also* Impink, col. 2, ll. 35–39 ("The methodologies both for ex-core neutron detector recalibration and for synthesis of a detailed three dimensional core power distribution from movable detector traces are well known in the art and are in *common use*." (emphasis added), *cited at* Final Act. 2). Appellants contend that "Impink II does not provide the support for the recited feature in claim 9 since the common use of Impink does not correspond to using neutron transport diffusion algorithms as described in Impink II" because "Impink and Impink II relate to solving power distributions based upon two fundamentally different parameters." Appeal Br. 8. According to Appellants, "Impink relates to two and three dimensional nuclear reactor core power distributions" (citing Impink, Abstract) whereas, "Impink II relates exclusively to a one dimensional (axial) analytical model" (citing Impink II, col. 5, ll. 14–26). *Id.*

The Examiner responds that "further support for Examiner's assertion of inherency can be found in [Impink II], which states 'the current analytical axial offset and axial pinch values are calculated using conventional neutronics equations such as the one dimensional diffusion theory algorithms, the one dimensional nodal algorithms or the one dimensional neutron transport algorithms.'" *Id.* (quoting Impink II, col. 8, ll. 31–35).

According to the Examiner, “[c]onversion of the one-dimensional analysis of Impink [II] to three-dimensional analysis would require only the addition of spatial variables and would not destroy the underlying Boltzmann diffusion theory on which the core power distribution calculation of Impink is founded.” *Id.*

We are not apprised of error in the Examiner’s further reliance on Impink II (*see* Final Act. 2–3; Ans. 8) in support of the finding that Impink (*see* Final Act. 9; Ans. 7–8) inherently discloses the limitation at issue—i.e., “solving a diffusion equation and updating an isotopic balance of the core during fuel depletion, from values of reactor operation parameters.” As an initial matter, we consider the Examiner’s discussion of Impink II as an *alternative* and *additional* basis to support the finding that Impink discloses the limitation at issue. For the reasons discussed above (*see supra* at p. 7 (first full paragraph)), Appellants have not shown error in the primary basis for the finding that Impink discloses the limitation at issue.

As to the merits of the alternative basis, Appellants assert that “[t]hose skilled in the art will understand that the further dimensional analyses does not enable a simple transportation of one set of calculations into the other, particularly from lesser dimensions [as in Impink II] into greater dimensions [as in Impink] which is the case at hand as proposed by the Examiner” (Appeal Br. 8), but Appellants do not support this argument with any evidence. *See In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (“Attorney’s argument in a brief cannot take the place of evidence.”). Similarly, Appellants’ assertion that “[t]hose skilled in the art will clearly and reasonably understand that the method of Impink and Impink II are very

different from the present application” (Appeal Br. 8) is not supported by evidence.

Third, we turn to the limitation “from values of reactor operation parameters, a neutronic calculation being carried out during a time step that is less than one minute” in clause *a*. Appellants argue that, in *Impink*, “[t]he information relative to the first power distribution are determined periodically and are stored in libraries (e.g., library 85. *Impink*; Fig. 5)” and that “[t]he periodicity of determination of a flux map is typically once each month.” Appeal Br. 9 (citing *Impink*, col. 9, ll. 56–58).

The Examiner responds that “while *Impink* does, as [Appellants] allege[], disclose calculating a first power distribution from a reference value in a library, *Impink* also discloses a first power distribution calculated from measured reactor values.” Ans. 8. In support, the Examiner quotes from column 8, lines 23 to 28, which provides, as emphasized by the Examiner, “[i]n one embodiment of the present invention, the display comprises deviations of the core power from reference values provided *by the core flux map which is periodically made or* from reference values from a previous thermocouple-generated power distribution.” *Id.*

To the extent Appellants’ argument asserts error in the Examiner’s findings regarding the language “from values of reactor operation parameters,” we are not apprised of error for the reasons stated by the Examiner, as set forth above. Appellants do not address these statements by the Examiner.

To the extent Appellants’ argument asserts error in the Examiner’s findings regarding the language “a neutronic calculation being carried out during a time step that is less than one minute,” we are not apprised of error

because nonobviousness cannot be established by attacking references individually when the rejection is based on a combination of prior art. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Here, by arguing that Impink *alone* does not disclose this limitation, Appellants do not address the rejection as articulated, in which the Examiner relies on the combination of Impink and Lin. *See* Final Act. 9–10.⁵

Clauses d.i to d.iv of Claim 9

We turn now to Appellants’ arguments regarding clauses *d.i* to *d.iv* of claim 9. First, Appellants state, “[i]n view of the above [arguments regarding clause *a*], as there is no disclosure of the use of a neutronic code in Impink that solves diffusion equations, it follows that Impink does not disclose or suggest a continuous controlling, by a processor of said neutronic calculation and of the steps for implementing said controlling.” Appeal Br. 9. For the reasons discussed in the prior section, however, we are not apprised of error based on the arguments regarding clause *a*.

Appellants also argue that “the portion of Impink relied upon for this feature of claim 9 has no relevance with a continuous control of a neutronic code” but instead “is focused on the recording of current values of the 3D core burnup distribution.” *Id.* (citing Impink col. 5, ll. 19–33); *see also* Final Act. 9 (citing Impink col. 5, ll. 19–33 for clause *d.i*).

We are not apprised of error based on this argument. Appellants paraphrase the language of clause *d.i* and state that the relied-upon portion of

⁵ We acknowledge that this argument was provided in a section asserting error in the now-withdrawn rejection of claims 9–11, 16, and 18 as anticipated by Impink. *See* Appeal Br. 6–9.

Impink “has no relevance” but do not sufficiently explain why. *See* 37 C.F.R. § 41.37(c)(1)(iv); *see also Lovin*, 652 F.3d at 1356–57.

Second, Appellants argue that “Impink and Lin do not disclose or suggest the above recited step for continuously controlling the neutronic calculation and its substeps”—i.e., clauses *d.i* to *d.iv*. Appeal Br. 11; *see also* Reply Br. 3 (asserting that “the continuous control recited in claim 9 with its substeps are not disclosed or suggested in the cited references and in the prior art of record”).⁶ Appellants contend that “[t]his continuous controlling step of claim 9 is an iterative process that is carried out in parallel with the reconstruction process (i.e., the determining steps of claim 9 [i.e., clauses *a* and *c*]) and is activated with the same periodicity as that of the reconstruction process.” Appeal Br. 11. According to Appellants, “the method for neutronic calculation as recited in claim 9 including adjustment of the neutronic calculation based on measurements and continuous control are carried out at each time step lower than one minute” and “[s]uch a combination of steps as recited in claim 9 is respectfully submitted as not being disclosed or suggested by D1 and D2, whether taken alone or in combination.” *Id.* at 12.⁷

The Examiner states that “Impink clearly discloses a reactor core power distribution calculation that occurs in real-time, i.e. continuously, in a

⁶ We note that Appellants also argue that Impink *alone* does not disclose clause *d.iii*. Appeal Br. 10. This argument, however, was provided in a section asserting error in the now-withdrawn rejection of claims 9–11, 16, and 18 as anticipated by Impink. *See* Appeal Br. 6–9. In the Rejection on appeal, the Examiner relies on Impink and Lin, in combination, to address clause *d.iii*. *See* Final Act. 9–10; *Merck*, 800 F.2d at 1097.

⁷ We understand “D1 and D2” to refer to Impink and Lin.

processor, the basis for [Appellants'] allegation that Impink does not disclose a step of 'continuously controlling, by the processor, the neutronic calculation.'" Ans. 9. The Examiner also states, "Impink discloses the adjustment step of the claim by stating 'local nuclear power values derived from the refined and modified three dimensional synthesis application'" *Id.* (citing Impink, col. 5, ll. 19–33).

As an initial matter, we agree with Appellants' implicit contention that the period of time between "time step t_i " (in clauses *d.ii* and *d.iii*) and "time step t_{i+1} " (in clause *d.iv*) are the same "time step" recited in clause *a*. We are not apprised of error, however, based on Appellants' argument. Here, the Examiner relies on, *inter alia*, (1) the disclosure of "time interval between successive syntheses" in column 5, line 25 of Impink regarding "neutronic calculation being carried out during a time step that is less than one minute" in clause *a*, (2) the *same* disclosure of "successive syntheses" in column 5, line 25 regarding limitation *d.iv* (reciting, *inter alia*, "at a following time step t_{i+1} "), (3) column 5, lines 19 to 33 of Impink regarding limitation *d.i*, and (4) Lin as teaching "successive calculations at time intervals of less than 0.25 seconds (column 2, line 63)." Final Act. 9. On the record here, Appellants have not shown error in the determination that the combination of Impink and Lin satisfies the "time step" aspects of clauses *d.i* to *d.iv*.

In addition to the general argument that clauses *d.i* to *d.iv* are not disclosed in the prior art (*see, e.g.*, Appeal Br. 11), in the Reply Brief, Appellants argue that:

performing a calculation in real-time and performing a controlling step are two wholly separate and distinguishable operations. Specifically, Impink merely provides a measuring

and monitoring capability. In contrast, claim 9 recites a functionality that performs more than a simple measuring and monitoring operation. Specifically, the calculation is performed using a basis that is determined from the recited substeps. Impink provides no such disclosure as whatever conditions and information is measured is used in the calculations performed therein. Lin also does not disclose or suggest such a control operation as recited in claim 9. In its entirety, Lin only describes comparable measuring and monitoring operations as disclosed in Impink.

Reply Br. 3.

We are not apprised of error in the finding that the relied-upon aspects of Impink and Lin (*see* Final Act. 9–10; Ans. 9) disclose the limitations at issue. With this argument, Appellants paraphrase aspects of the limitations at issue and assert that the prior art does not disclose those limitations, but do not show error in the Examiner’s findings. *See* 37 C.F.R.

§ 41.37(c)(1)(iv); *see also Lovin*, 652 F.3d at 1356–57. Moreover, Appellants argue the references individually rather than addressing the combination proposed. *See* Final Act. 9–10 (relying on Impink and Lin regarding clauses *d.i* to *d.iv*); *Merck*, 800 F.2d at 1097 (“Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.”).

Although we agree with Appellants that a “real-time” calculation is not necessarily the same as “continuously controlling” a calculation (Reply Br. 3 (discussing Ans. 9)), here, we determine that Appellants have not shown error in the findings that the relied-upon aspects of the prior art disclose clauses *d.i* to *d.iv*. *See* Final Act. 9–10; Ans. 9. For example, we note that the portion of Impink relied on by the Examiner regarding clause *d.i* (column 5, lines 19 to 33 (Final Act. 9)), does not use the term “real

time.” Moreover, we note that, in the Answer, the Examiner discusses the “adjusting” aspect of clause *d.iii* (Ans. 9 (quoting portions of Impink, col. 5, ll. 19–33)), whereas, in the Reply Brief, Appellants do not address this discussion, but rather essentially repeat a prior argument regarding, *inter alia*, the “adjusting” aspect. Compare Reply Br. 3–4 (paragraph spanning page break), with Appeal Br. 12 (first full paragraph). And that prior argument essentially repeats portions of the Specification (*see* Spec. 16, ll. 1–24) and then asserts that “[t]his entire process which is recited in claim[] 9 . . . is clearly not disclosed or suggested by Impink and Lin.” On the record here, Appellants have not shown error in the finding that the combination of Impink and Lin satisfies clauses *d.i* to *d.iv*.

For the reasons set forth above, we sustain the rejection of independent claim 9. Claims 10, 11, 16, and 18 fall with claim 9.

NEW GROUND OF REJECTION

We enter a new ground of rejection of claims 9–11, 16, and 18 under 35 U.S.C. § 101 as directed to patent-ineligible subject matter.

The Supreme Court has set forth “a framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice Corp. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs, Inc.*, 132 S. Ct. 1289, 1294 (2012)). Under that framework, we first “determine whether the claims at issue are directed to one of those patent-ineligible concepts”—i.e., a law of nature, a natural phenomenon, or an abstract idea. *Id.* (citing *Mayo*, 132 S. Ct. at 1296–97). If so, we secondly “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.” *Id.* (quoting *Mayo*, 132 S. Ct. at 1298, 1297). The Supreme Court has described the second step of the analysis as “a 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*, 132 S. Ct. at 1294).

Claim 9 is directed to a “method for determining a three-dimensional power distribution of a core of a nuclear reactor implemented by a programmed device” that uses data from various sources to perform certain mathematical calculations. Appeal Br. 14–15 (Claims App.). Claim 18 is directed to a similar method. *Id.* at 17. Claim 16 is directed to a “non-transitory computer readable storage medium including a set of instructions for determining a three-dimensional power distribution of a core of a nuclear reactor implemented by a programmed device” in which the “set of instructions [is] operable to” perform mathematical calculations similar to those in claim 9. *Id.* at 16.

We determine, under the first step of the analysis, that each of independent claims 9, 16, and 18 is directed to the abstract idea of receiving data and, using recited algorithms, generating additional data.⁸ Our

⁸ Although the claims here recite the algorithms in words rather than as mathematical formulas, the claims nevertheless recite algorithms. *See In re Grams*, 888 F.2d 835, 837 n.1 (Fed. Cir. 1989) (“It is of no moment that the algorithm is not expressed in terms of a mathematical formula. Words used in a claim operating on data to solve a problem can serve the same purpose as a formula.”).

reviewing courts have held claims ineligible under § 101 when directed to manipulating existing information, using algorithms, to generate additional information. *See Parker v. Flook*, 437 U.S. 584, 585, 594–96 (1978) (rejecting as ineligible claims directed to (1) measuring the current value for a variable in a catalytic conversion process, (2) using an algorithm to calculate an updated “alarm-limit value” for that variable, and (3) updating the limit with the new value); *Gottschalk v. Benson*, 409 U.S. 63, 71–72 (1972) (rejecting as ineligible claims directed to an algorithm for converting binary-coded decimal numerals into pure binary form); *Elec. Power Grp. v. Alstom S.A.*, 830 F.3d 1350, 1353–54 (Fed. Cir. 2016) (discussing how “collecting information” and “analyzing information by steps people go through in their minds, or by mathematical algorithms, without more” are abstract ideas); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014) (“Without additional limitations, a process that employs mathematical algorithms to manipulate existing information to generate additional information is not patent eligible.”).

Turning to the second step of the analysis, we determine that the additional elements of claims 9, 16, and 18, individually and as ordered combinations, do not transform the nature of the independent claims into patent-eligible subject matter.

We first address certain language ostensibly limiting the use of the recited steps to determining the “three-dimensional power distribution of a core of a nuclear reactor.” Appeal Br. 14, 16, 17. Attempting to limit the use of an abstract idea to a particular technological environment does not render claims 9, 16, and 18 patent eligible because the limitations at issue do not mitigate preemption concerns (*see Alice*, 134 S. Ct. at 2358) and do not

transform the claims into patent-eligible applications of the abstract idea (*see Elec. Power*, 830 F.3d at 1354).

We next address the term “programmed device,” as recited in each of the independent claims. We determine that this term does not add anything that transforms the nature of the claims from an abstract idea into a patent-eligible invention because, for the reasons discussed below, the “programmed device” includes a general-purpose computer. And as the Supreme Court has explained, “the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention.” *Alice*, 134 S. Ct. at 2358 (“Stating an abstract idea ‘while adding the words “apply it”’ is not enough for patent eligibility.” (quoting *Mayo*, 132 S. Ct. at 1294)). The Specification here does not narrow the scope of “programmed device,” but rather merely provides that the “programmed device” implements the disclosed method (Spec. 8, ll. 7–8) and “disposes” information from various sources (*id.* at 10, ll. 1–12).

The view that “programmed device” includes a general-purpose computer is supported by Appellants’ statements on appeal. In the Office Action, the Examiner found that Impink disclosed a “programmed device,” citing column 8, lines 57–62. *See* Final Act. 8, 10, 12. Appellants agree with that finding, stating, “[a]s noted by the Examiner, Impink discloses a method for determining a three-dimensional power distribution of a core of a nuclear reactor implemented by a programmed device including a processor and a non-transitory computer readable storage medium.” Appeal Br. 7 (citing, *inter alia*, Impink, col. 8, ll. 57–62). The passage cited by both the Examiner and Appellants provides that “the present invention comprises a set of computational algorithms and computational control logic embodied

in computer software *which is executed on a digital computer.*” Impink, col. 8, ll. 59–62 (emphasis added).

We next address that claim 16 recites a “*non-transitory computer readable storage medium including a set of instructions* for determining a three-dimensional power distribution of a core of a nuclear reactor” rather than (as in claims 9 and 18) a “*method* for determining a three-dimensional power distribution of a core of a nuclear reactor.” Appeal Br. 14, 16, 17 (emphasis added). The language shown with emphasis above in claim 16 does not affect our conclusion regarding step two. We determine that claim 16 is not “truly drawn to a specific computer readable medium, rather than to the underlying method.” *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1374–75 (Fed. Cir. 2011) (internal quotation marks omitted). Accordingly, we treat claim 16 as a method claim for patent-eligibility purposes. *See id.* at 1375.

Having determined that independent claims 9, 16, and 18 are directed to abstract ideas and that the claim elements, individually and as ordered combinations, do not transform the claims into patent-eligible subject matter, we reject claims 9, 16, and 18 under 35 U.S.C. § 101. We also reject dependent claims 10 and 11, which merely provide further limitations on the mathematical calculations performed. For the same reasons discussed above, these further limitations are insufficient to transform the nature of claims 10 and 11 into patent-eligible subject matter. Accordingly, we reject claims 10 and 11 under 35 U.S.C. § 101.

DECISION

We *affirm* the decision to reject claims 9–11, 16, and 18 under 35 U.S.C. § 103(a).

We enter a *new ground of rejection* of claims 9–11, 16, and 18 under 35 U.S.C. § 101 as directed to patent-ineligible subject matter.

FINALITY OF DECISION

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b). Section 41.50(b) provides “[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review.” Section 41.50(b) also provides:

When the Board enters such a non-final decision, the appellant, within two months from the date of the decision, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new Evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the prosecution will be remanded to the examiner. The new ground of rejection is binding upon the examiner unless an amendment or new Evidence not previously of Record is made which, in the opinion of the examiner, overcomes the new ground of rejection designated in the decision. Should the examiner reject the claims, appellant may again appeal to the Board pursuant to this subpart.

(2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same Record. The request for rehearing must address any new ground of rejection and state with particularity the points believed to have been misapprehended or overlooked in entering the new ground of rejection and also state all other grounds upon which rehearing is sought.

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Further guidance on responding to a new ground of rejection can be found in the Manual of Patent Examining Procedure § 1214.01.

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; 37 C.F.R. § 41.50(b)