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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JUN LIU, HUI XUE, MARCEL DOMINIK NICKEL, TI-CHIUN CHANG, MARIAPPAN S. NADAR, ALBAN LEFEBVRE, EDGAR MUELLER, QIU WANG, ZHILI YANG, NIRMAL JANARDHANAN and MICHAEL ZENGE[1]

Appeal 2017-011132
Application 13/779,999
Technology Center 2600

Before KAREN M. HASTINGS, AVELYN M. ROSS, and DEBRA L. DENNETT, *Administrative Patent Judges*.

HASTINGS, *Administrative Patent Judge.*

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's decision rejecting claims 2–17[2]. We have jurisdiction under 35 U.S.C. § 6.

We AFFIRM.

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[1] Siemens Corp. and Siemens Aktiengesellschaft are identified as the real parties in interest. Appeal Br. 1.

[2] Claim 1 was withdrawn via an amendment by Appellants on August 7, 2015.

Independent claim 2 is illustrative of the claimed subject matter:

2. A method for correcting for coil sensitivity differences in generating a parallel magnetic resonance (MR) image, comprising the steps of:

providing a matrix *A* of 20 sliding block vectors of a 20 image of coil calibration data acquired from a parallel magnetic imaging apparatus, wherein

$$A = \begin{pmatrix} \mathbf{a}_{1,1} & \mathbf{a}_{1,2} & \cdots & \mathbf{a}_{1,n_b} \\ \mathbf{a}_{2,1} & \mathbf{a}_{2,2} & \cdots & \mathbf{a}_{2,n_b} \\ \cdots & \cdots & & \cdots \\ \mathbf{a}_{n_c,1} & \mathbf{a}_{n_c,2} & \cdots & \mathbf{a}_{n_c,n_b} \end{pmatrix},$$

n_c is a number of coils, n_b is a number of sliding blocks extracted from the coil calibration data, and $\boldsymbol{a}_{i,j}$ is a $k_x k_y \times 1$ column vector obtained by concatenating columns that represents a *j*th sliding block of an *i*th coil, wherein k_x and k_y are scalars defining a block of size $k_x \times k_y$;

calculating a left singular matrix $V_{||}$ from a singular value decomposition of A,

wherein $A = V\Sigma U^H$ and $V_{||} = [\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_\tau] = \begin{pmatrix} \mathbf{v}_{1,1} & \mathbf{v}_{1,2} & \cdots & \mathbf{v}_{1,\tau} \\ \mathbf{v}_{2,1} & \mathbf{v}_{2,2} & \cdots & \mathbf{v}_{2,\tau} \\ \cdots & \cdots & & \cdots \\ \mathbf{v}_{n_c,1} & \mathbf{v}_{n_c,2} & \cdots & \mathbf{v}_{n_c,\tau} \end{pmatrix}$

is a matrix of left singular vectors of *A* corresponding to $\mathbf{T}$ leading singular values wherein H denotes a complex-conjugate transpose, $\mathbf{v}_{i,k}$ is a $k_x k_y \times 1$ column vector obtained by concatenating columns, which $\mathbf{v}_{i,k}$ is an *i*-th block in vector $\mathbf{v}_k$, wherein $\mathbf{v}_k$, k=1, 2, … , $\mathbf{T}$, is a component of $V_{||}$;

calculating

$$P = V_{\parallel} V_{\parallel}^{H} = \begin{pmatrix} \begin{pmatrix} \mathbf{p}_{1,1,1} & \mathbf{p}_{1,1,2} & \cdots & \mathbf{p}_{1,1,k_x k_y} \\ \mathbf{p}_{1,2,1} & \mathbf{p}_{1,2,2} & \cdots & \mathbf{p}_{1,2,k_x k_y} \\ \cdots & \cdots & \cdots & \cdots \\ \mathbf{p}_{1,n_c,1} & \mathbf{p}_{1,n_c,2} & \cdots & \mathbf{p}_{1,n_c,k_x k_y} \end{pmatrix} & \cdots & \begin{pmatrix} \mathbf{p}_{n_c,1,1} & \cdots & \mathbf{p}_{n_c,1,k_x k_y} \\ \mathbf{p}_{n_c,2,1} & \cdots & \mathbf{p}_{n_c,2,k_x k_y} \\ \cdots & \cdots & \cdots \\ \mathbf{p}_{n_c,n_c,1} & \cdots & \mathbf{p}_{n_c,n_c,k_x k_y} \end{pmatrix} \end{pmatrix}$$

wherein $\mathbf{p}_{i,j,t}$, i=1, . . . , n_c, j=1, . . . , n_c, t=1, . . . , $k_x k_y$, is a $k_x k_y \times 1$ column vector of $n_c \times n_c$ matrices;

calculating $\mathbf{s}_{i,j,t} = \mathbf{F}^H(\mathbf{P}_t(\mathbf{p}_{i,j,t}))$ wherein $\mathbf{F}^H$ represents an inverse Fourier transform and $\mathbf{P}_t$ represents a zero-padding operator; and

solving $M^H \mathbf{c}^r = (S^r)^H \mathbf{c}^r$ for $\mathbf{c}^r$, where $\mathbf{c}^r$ is a vector of coil sensitivity maps for all coils at spatial location r, wherein S^r is a vector of matrices of values $\mathbf{s}_{i,j,t}$ at a spatial location r in the image,

$$S^r = \begin{pmatrix} \begin{pmatrix} s^r_{1,1,1} & s^r_{1,1,2} & \cdots & s^r_{1,1,k_x k_y} \\ s^r_{1,2,1} & s^r_{1,2,2} & & s^r_{1,2,k_x k_y} \\ \cdots & \cdots & \cdots & \cdots \\ s^r_{1,n_c,1} & s^r_{1,n_c,2} & \cdots & s^r_{1,n_c,k_x k_y} \end{pmatrix} & \cdots & \begin{pmatrix} s^r_{n_c,1,1} & \cdots & s^r_{n_c,1,k_x k_y} \\ s^r_{n_c,2,1} & \cdots & s^r_{n_c,2,k_x k_y} \\ \cdots & \cdots & \cdots \\ s^r_{n_c,n_c,1} & \cdots & s^r_{n_c,n_c,k_x k_y} \end{pmatrix} \end{pmatrix}$$

and

$$M = \begin{pmatrix} \begin{pmatrix} 1 & 1 & \cdots & 1 \\ 0 & 0 & \cdots & 0 \\ \cdots & \cdots & & \cdots \\ 0 & 0 & \cdots & 0 \end{pmatrix} & \begin{pmatrix} 0 & 0 & \cdots & 0 \\ 1 & 1 & \cdots & 1 \\ \cdots & \cdots & & \cdots \\ 0 & 0 & \cdots & 0 \end{pmatrix} & \cdots & \begin{pmatrix} 0 & 0 & \cdots & 0 \\ 0 & 0 & \cdots & 0 \\ \cdots & \cdots & & \cdots \\ 1 & 1 & \cdots & 1 \end{pmatrix} \end{pmatrix},$$

and

using the vector of coil sensitivity maps to correct coil sensitivities, which corrected coil sensitivities are used to generate said parallel MR image by finding a parallel MR image $\mathbf{m}$ that minimizes the expression

$$\frac{1}{2}\sum_{i=1}^{n_c} \left\| F_u(\mathbf{c}_i \otimes \mathbf{m}) - \mathbf{y}i \right\|_2^2 + \lambda \left\| W\mathbf{m} \right\|_1,$$

wherein F_u is an undersampling Fourier transformation operator, $\mathbf{c}_i$ denotes the coil sensitivity map for the i-th coil, $\mathbf{y}_i$

> represents observed undersampled *k*-space data for the *i*-th coil, *W* is a redundant Haar wavelet transformation, and λ is a weighting factor.

Independent claim 10 is directed to a non-transitory program storage device having program instructions to perform the same steps as set out in claim 2 for correcting coil sensitivity differences in generating a parallel magnetic resonance (MR) image using a vector of coil sensitivity maps (Appeal Br. 21–23 (Claims Appendix)).

Appellants do not separately argue independent claim 10 from claim 2. Accordingly, we select claim 2 as representative of the independent claims.

THE REJECTIONS

The following rejections made by the Examiner are maintained on appeal:

1. Claims 2–17 under 35 U.S.C. § 112(a) for failing to comply with the written description requirement;
2. Claims 2–17 under 35 U.S.C. § 112(b) as being indefinite; and
3. Claims 2–17 under 35 U.S.C. § 101 for being directed to an abstract idea.

ANALYSIS

We have reviewed each of Appellants' arguments. However, we determine that a preponderance of the evidence supports the Examiner's finding that the language of independent claims 2 and 10 is indefinite, that the claims lack written description support and that the claims are directed to

non-statutory subject matter under 35 U.S.C. § 101. Accordingly, we will sustain the Examiner's §§ 112(a) and (b) rejections in addition to the Examiner's rejection under § 101 for essentially those reasons expressed in the Answer, including the Examiner's Response to Argument section.

The § 112(a) Written Description Rejection

Appellants do not present separate arguments specifically directed to any of the dependent claims under rejection (Appeal Br. 6–9). Accordingly, the dependent claims will stand or fall with their parent independent claims of which claim 2 is representative.

For an applicant to comply with the 35 U.S.C. § 112, first paragraph, written description requirement, Appellants' Specification must "convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention." *Carnegie Mellon Univ. v. Hoffmann-La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008) (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991)). We must first interpret the disputed claim language by giving the terms thereof the broadest reasonable interpretation in their ordinary usage as they would be understood by one of ordinary skill in the art in light of the written description in the Specification, including the drawings, as interpreted by this person, unless another meaning is intended by Appellants as established in the written description of the Specification, and without reading into the claims any limitation or particular embodiment disclosed in the Specification. *See, e.g.*, *In re Morris*, 127 F.3d 1048, 1054–55 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321–22 (Fed. Cir. 1989).

The Examiner determines that Appellants do not have written description support for the independent claim limitations "correcting for coil

sensitivity differences" (claims 2 and 10) and "using the vector of coil sensitivity maps to correct coil sensitivities, which corrected coil sensitivities are used to generate said parallel MR image by finding a parallel MR image **m** that minimizes the expression" (claims 2 and 10; Ans. 3; *see also* Adv. Act. 2). According to the Examiner, since the Background section of Appellants' Specification teaches that parallel imaging exploits the varying sensitivities of receiver coils, it does not teach that there is a need for "correcting for coil sensitivity differences" as disclosed in the preamble and body of the claims (claims 2 and 10). The Examiner also finds that "the recited expression" in the claims refers to equation 36 of Appellants' Specification, which "suggests performing MR reconstruction using a minimized expression" but does not teach "'using the . . . corrected sensitivities . . . to generate . . . a parallel MR image that minimizes the recited expression'" (Ans. 4, 6).

Assuming arguendo that Appellants are correct that the disclosure reasonably would convey to one of ordinary skill in the art that the inventors had possession of the subject matter in the limitation "correct[ing] coil sensitivities," nonetheless, we agree with the Examiner that the second limitation "using the . . . corrected sensitivities . . . to generate . . . a parallel MR image that minimizes the recited expression" lacks written description support.

Appellants argue that support for the limitation "using the vector of coil sensitivity maps to correct coil sensitivities, which corrected coil sensitivities are used to generate said parallel MR image by finding a parallel MR image **m** that minimizes the expression" is "found in the [S]pecification as originally filed at page 28" (Appeal Br. 8), however,

Appellants' argument is not persuasive. The recited expression in the claims is reproduced from equation 36 disclosed on page 28 of Appellants' Specification. Appellants' Specification and claims fail to explain which elements in the recited expression (i.e., equation 36) refer to "corrected sensitivities." In addition, although the claims disclose "using the vector of coil sensitivity maps to correct coil sensitivities," Appellants' claims do not disclose actually generating the corrected core sensitivities. Consequently, it is unclear how these corrected coil sensitivities (which are not explicitly generated) are then subsequently used to generate a parallel MR image by finding a parallel MR image **m** that minimizes the recited expression. Furthermore, it is unclear how **m** can be found to minimize the recited expression when **m** is itself a part of the recited expression. It is also unclear from Appellants' disclosure how any of the calculations performed in claim 2 (for allegedly determining the corrected coil sensitivities) listed prior to "recited expression" representing equation 36 are used in equation 36 to generate the parallel MR image. Claim 2 discloses generating a matrix A from a 2D image of coil calibration data, then calculating a left singular matrix from a singular value decomposition of A, then calculating P, s and solving for c^r. However, neither the matrix A data, the left singular matrix data, P, S, c^r or some new variable representing "corrected coil sensitivities" is disclosed as part of the recited expression 36. It is, therefore, unclear how exactly the corrected coil sensitivities are "used" to generate the parallel MR image or find a parallel MR image that minimizes the expression.

Appellants' Specification also does not clearly explain the relationship between the other variables in the preceding equations and equation 36. In particular c^r is disclosed by the Specification as being "the optimizer that

maximizes the correlation between . . . the left and right hand sides of EQ. (19)" (Spec. 19), however, the Specification fails to explain how that determination leads to correcting coil sensitivities and generating the parallel MR image. The claim essentially comprises a list of multiple equations without adequately explaining how each of the equations relate to one another to generate the final alleged result. Furthermore, the recited expression 36 is set apart in the Testing section of Appellants' Specification as a means for performing Reconstruction. The recited expression 36 is merely stated as being used for MR reconstruction without any explanation of how the equation relates to the 35 equations previously discussed in the Specification. Particularly absent from the Specification is any disclosure of how the corrected sensitivities are used to find the parallel MR image m that minimizes the recited expression. While m is a variable in expression 36, it is not being solved for and there is no variable for "corrected sensitivities" in the recited expression. Finally, we emphasize that Appellants do not identify any disclosure that explains the relationship of all of the prior equations and/or their variables to equation 36 for performing the MR image reconstruction.

In light of the foregoing, we determine that Appellants fail to identify disclosure which reasonably conveys to those skilled in the art that the inventors had possession of the claim subject matter under consideration.

We sustain the § 112(a) rejection of all claims.

The § 112(b) Rejection

During prosecution, claims are definite if they "set out and circumscribe a particular area with a reasonable degree of precision and particularity." *In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971).

The Examiner found that independent claims 2 and 10 are indefinite because the preamble limitation "correcting for coil sensitivity differences" is not supported by the body of the claim (Ans. 7–8), it is not clear whether the matrix A refers to the 2D sliding block vectors of a 2D image or a $k_x k_y$ x 1 column vector obtained by concatenating columns that represents a *j*th sliding block of an *i*th coil (Final Action 4), neither the Specification or the claims provide a definition for the parameters V and U from the equation $A = V\Sigma U^H$ (Ans. 9), it is not clear how c^r is solved because equation 23 from the Specification explaining how to solve for c^r is missing (*id.* at 10–13) and that it is unclear what the expression being minimized represents (*id.* at 10–14) and it is unclear from the final claim paragraph what the parallel MR image **m** minimizes (Final Action 4). Assuming arguendo that Appellants are correct that one of ordinary skill in the art would recognize that they are correcting for coil sensitivities as set forth in the preamble, that matrix A was clearly defined, c^r is solved, and what the parallel MR image **m** is minimizing, nonetheless we agree with the Examiner that the variables V and U are undefined and indefinite.

Appellants contend that the parameter V is defined as the matrix and the parameter U is defined with regards to the term "F_u" (Appeal Br. 9).

In prosecution before the PTO "[i]t is the applicants' burden to precisely define the invention, not the PTO's." *Morris*, 127 F. 3d at 1056. The purpose of this requirement is to provide the public with adequate notice

of the boundaries of protection involved. The time to do so is during prosecution where an applicant has the ability to amend the claims to more precisely define the metes and bounds of the claimed invention. *See Ex Parte Miyazaki*, 89 USPQ2d 1207, 1210–12 (BPAI 2008).

Contrary to Appellants' position, a preponderance of the evidence supports the Examiner's position that the variables U and V are undefined. The claims do not define V from equation A. Instead, they define the left singular matrix $V_{||}$. It is unclear if V is supposed to refer to $V_{||}$. The parameter U is not the same as "F_u" since, as explained *supra*, the relationship between the variables in the expression minimized at the end of the claims and the variables in the all of the prior equations is not clear. Furthermore, only the collective variable "F_u" with a subscript u is defined for the expression rather than "U" and it is not clear that the definitions for that expression apply to any other variables in the claim. Therefore, the claims do not provide any guidance on how to define U. In addition, the Specification does not clearly define either V or U. At most, the Specification notes that the equation comprising V and U, which is equation 8 in the Specification, denotes equation 9 (Spec. 14). In addition, we note that the claims appear to define A as both a matrix and the equation.

Consequently, we agree with the Examiner that the appealed claims are rendered indefinite by the limitations of independent claims 2 and 10 disclosing the equation $A = V\Sigma U^{H}$ (Final Action 4).

Appellants' statement and argument are not supported by evidence and, therefore, lack persuasive merit. Furthermore, Appellants do not address the Examiner's determination that the claims are rendered indefinite because the Specification does not define the relationship between the

variables under review (*see* Reply Br. 3). For these reasons, Appellants have not provided this record with persuasive responses to the clarity problems identified by the Examiner. *See In re Packard*, 751 F.3d 1307, 1313 (Fed. Cir. 2014) ("Given the role of the applicant in the process, it is a reasonable implementation of the examination responsibility, as applied to § 112(b), for the USPTO, upon providing the applicant a well-grounded identification of clarity problems, to demand persuasive responses on pain of rejection.").

We sustain the § 112(b) rejection of all claims.

The § 101 Rejection

Appellants do not present separate arguments specifically directed to any of the dependent claims under rejection (Appeal Br. 12–17). Accordingly, the dependent claims will stand or fall with their parent independent claims of which claim 2 is representative.

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 § 101.

According to *Alice* step one, "[w]e must first determine whether the claims at issue are directed to a patent-ineligible concept," such as an abstract idea. *Id.* at 2355. In that regard, the Examiner determined that the claims are directed to using the vector of coil sensitivity maps to correct coil sensitivities and using the corrected coil sensitivities to generate a parallel MR image which are similar to the abstract idea of organizing information according to mathematical correlations and concluded that the subject matter of the claims is directed to the judicial exception of abstract ideas (Ans. 18–19).

Appellants challenge the Examiner's articulation of what the claims are directed to by arguing that the Examiner fails to analyze each claim as a whole, but the challenge is unfounded (*see* Appeal Br. 15–16; Reply Br. 4–6). For example, the fact that the claims are drafted to correct coil sensitivity differences is not dispositive. The question is what the claims are "directed to."

> [T]he "directed to" inquiry applies a stage-one filter to claims, considered in light of the specification, based on whether "their character as a whole is directed to excluded subject matter." *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015); *see Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1375 . . . (Fed. Cir. 2016) (inquiring into "the focus of the claimed advance over the prior art").

Enfish, LLC v. Microsoft Corp., 822 F.3d 1327, 1335 (Fed. Cir. 2016). "The 'abstract idea' step of the inquiry calls upon us to look at the 'focus of the claimed advance over the prior art' to determine if the claim's 'character as a whole' is directed to excluded subject matter." *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016) (quoting *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016)). "In determining the eligibility of respondents' claimed process for patent protection under § 101, their claims must be considered as a whole." *Diamond v. Diehr*, 450 U.S. 175, 188 (1981).

As set out in the Background section of Appellants' Specification, it was known to use joint estimation and eigenvector approaches to compensate for differences in sensitivity functions in order calibrate coil-by-coil reconstruction (Spec. 2). The claims are directed to using the "detailed mathematical derivations for the eigenvector approach" (*id.*) to correct coil sensitivity differences and generate a parallel MR image.

Accordingly, the claims as a whole, in light of the Specification, are directed to performing mathematical derivations of the eigenvector approach as part of a calibration process for correcting sensitivities and minimizing an expression, which is consistent with the Examiner's position (Final Action 5–6; Ans. 18–22). There appears to be no dispute that the mathematical derivations of the eigenvector approach and minimizing of the expression constitute organizing eigenvector information through mathematical calculations (i.e., are abstract ideas) (Appeal Br. 15–16, admitting that the mathematical concepts of calculating a left singular matrix, performing calculations using matrices, and minimizing mathematical expressions are known).

Step two is "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.'" *Alice*, 134 S. Ct. at 2355 (alteration in original) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 72–73 (2012)). In response to Appellants' argument that "the 'character as a whole' of the claims clearly relates to improvements in computer-related technology that pertains to magnetic resonance imaging, which is recognized and understood as a practical, useful and beneficial tool in the practice of medicine and medical diagnostics" (Appeal Br. 15–16), the Examiner determined that, generically linking the use of a judicial exception to a particular technological environment or field of use (i.e., to magnetic resonance imaging) is insufficient because "[t]he claims do not include additional elements that are sufficient to amount to significantly more than the abstract idea" because they do not provide meaningful limitation(s) to

transform the abstract idea into a patent eligible application of the abstract idea (Ans. 20). In particular, the Examiner finds that "[w]hile the term 'improvement(s)' is mentioned, there are no discussions of, e.g., what the capabilities of the existing technology are, accordingly, what the specific improvements to existing technology are, which claimed steps directed to the improvements are" (*id.*). There is no disclosure in the claims or Specification to indicate computer-specific hardware that is being improved, nor does the Specification disclose in detail how performing equation 36 or any of the preceding 35 mathematical equations leads to an improvement in MR tools.

The Specification does not support Appellants' argument that the additional elements comprise significantly more than the abstract idea of organizing eigenvector data according to mathematical correlations and data gathering to generate a MR image. The claims do not specify any devices as performing the mathematical steps. In addition, the Specification does not disclose the mathematical steps as being tied to any special or non-generic hardware. *Cf. Alice*, 134 S. Ct. 2358 (citation omitted). "[T]he mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention. Stating an abstract idea 'while adding the words "apply it"' is not enough for patent eligibility." *Id.* The fact that the claims end by disclosing generating an MR image through a mathematical expression without adequately explaining how that constitutes an improvement or is tied to MR non-generic hardware causes the final paragraph of the claims to be tantamount to a generic statement of applying it by simply stating that the result of the mathematical calculations is "applied" towards generating a MR image.

Finally, Appellants argue that the claims comprise significantly more than the abstract idea because "the [E]xaminer acknowledges" that the claimed combination of limitations in the independent claims "is not disclosed or suggested by the prior art" (Appeal Br. 16 (citing to Final Action 7)). However, a finding of novelty or nonobviousness does not necessarily lead to the conclusion that subject matter is patentable eligible. "Groundbreaking, innovative, or even brilliant discovery does not by itself satisfy the § 101 inquiry." *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 591 (2013). The question in step two of the Alice framework is not whether an additional feature (i.e., the calculation) is novel but whether the implementation of the abstract idea involves "more than performance of 'well-understood, routine, [and] conventional activities previously known to the industry.'" *Content Extraction and Transmission LLC v. Wells Fargo Bank, Nat. Ass'n*, 776 F.3d 1343, 1347–48 (Fed. Cir. 2014) (quoting *Mayo*, 566 U.S. at 73) based upon whether "[t]aking the claim elements separately, the function performed by the computer at each step of the process is '[p]urely conventional.'" *Alice* at 2359 (citing *Mayo,* 566 U.S. at 66); *cf. id.* at 2359 ("Considered 'as an ordered combination,' the computer components of petitioner's method 'ad[d] nothing . . . that is not already present when the steps are considered separately.") Regardless of whether the mathematical function itself is novel, the claims do not recite a computer or non-generic hardware performing any functions that are not purely conventional because the steps of the claim limitations are not tied to any computer hardware. As such, when considered as an ordered combination, the computer components (or complete lack thereof) of

Appellants' method adds nothing that is not already present when the steps are considered separately.

DECISION

The rejection of claims 2–17 under 35 U.S.C. § 112(a) for failing to comply with the written description requirement is affirmed.

The rejection of claims 2–17 under 35 U.S.C. § 112(b) as being indefinite is affirmed.

The rejection of claims 2–17 under 35 U.S.C. § 101 is affirmed.

The decision of the Examiner is affirmed.

TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED