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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte ROSS HAACKE,
GORDON POOLE, and
MARGHERITA MARASCHINI

_____

Appeal 2018-009159
Application 14/651,382
Technology Center 2800

_____

Before DONNA M. PRAISS, MICHELLE N. ANKENBRAND, and
JEFFREY R. SNAY, *Administrative Patent Judges*.

ANKENBRAND, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant[1] appeals under 35 U.S.C. § 134(a) from the Examiner's

decision[2] finally rejecting claims 1–20. We have jurisdiction under

35 U.S.C. § 6(b).

We affirm.

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[1] Appellant is the Applicant, CGG Services SA, which, according to the
Brief, is a real party in interest. Appeal Brief, filed April 19, 2018
("Appeal Br.") 2.
[2] Final Action, mailed November 24, 2017 ("Final Act.").

STATEMENT OF THE CASE

Background

The subject matter on appeal relates to "methods and devices used for processing seismic data and, more particularly, to generating models of signal and/or noise using data-domain weights based on estimated signal-to-noise ratios." Specification, filed June 11, 2015 ("Spec.") ¶ 2. According to the Specification, seismic waves reflected from interfaces between geological layers are used in the oil and gas industry to search for and evaluate hydrocarbon deposits. *Id.* ¶ 3. Such seismic waves may be generated from sources that are activated so signals corresponding to one shot of a source do not overlap with signals corresponding to another shot. *Id.* ¶ 8. However, shorter intervals may be provided between the activation of sources, which causes signals created by different sources to overlap. *Id.* ¶ 10, Fig. 2A. Due to this, it is necessary to separate the wavelets associated with different shots via denoising techniques. *Id.* ¶¶ 10, 12–19.

Appellant discloses a method for processing seismic data recorded by receivers while exploring an underground formation. *Id.* ¶ 22. The method includes, among other things, selecting a spatio-temporal block of data from seismic data, estimating signal-to-noise ratios of data in the block of data for a signal that is coherent with first seismic waves and a noise that is not coherent with the first seismic waves, determining data-domain weights associated to the data based on the signal-to-noise ratios, generating a model of the signal and/or a model of the noise using the data-domain weights, and creating an image of the underground formation using the model of the signal and/or model of the noise. *Id.* According to the Specification, Appellant's embodiments yield accurate predictions in the presence of

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irregularly distributed data and/or signals that have a moderate degree of aliasing, despite strong noise of any probability distribution. *Id.* ¶ 21.

Of the appealed claims, claims 1, 19, and 20 are independent. Claim 1 is representative of the subject matter on appeal, and reproduced below:

> 1.   A method for processing seismic data recorded by receivers while exploring an underground formation, the method comprising:
>
> > [i] selecting a spatio-temporal block of data from the seismic data;
> >
> > [ii] estimating signal-to-noise ratios of data in the spatio-temporal block of data, for a signal that is coherent with first seismic waves used to explore the underground formation and a noise that is not coherent with the first seismic waves;
> >
> > [iii] determining data-domain weights associated to the data, the data-domain weights being determined based on the estimated signal-to-noise ratios;
> >
> > [iv] generating a model of the signal and/or a model of the noise using the data-domain weights; and
> >
> > [v] creating an image of the underground formation using the model of the signal and/or the model of the noise.

Appeal Br. 11 (Claims App'x).

The Rejection

The Examiner maintains the following rejection on appeal:

Claims 1–20 are rejected under 35 U.S.C. § 101 as being directed to patent ineligible subject matter.

OPINION

After having considered the evidence presented in this Appeal and each of Appellant's contentions, Appellant does not identify reversible error

with respect to the Examiner's rejection of claims 1–20. We affirm the
Examiner's rejection of those claims for the reasons expressed in the Final
Action, the Answer, and explained below.

Legal Framework

In determining whether a claim falls within a category excluded from
eligible subject matter, our inquiry focuses on the Supreme Court's two-step
framework described in *Mayo Collaborative Services v. Prometheus
Laboratories, Inc.*, 566 U.S. 66 (2012), and *Alice Corp. v. CLS Bank
International*, 573 U.S. 208 (2014). *Alice*, 573 U.S. at 217–18 (citing *Mayo*,
566 U.S. at 75–77). In accordance with that framework, we first determine
what concept the claim is "directed to." *See Alice*, 573 U.S. at 219.

Concepts determined to be abstract ideas and, thus, patent ineligible
include certain methods of organizing human activity, such as fundamental
economic practices (*e.g.*, *Alice*, 573 U.S. at 219–20); mathematical formulas
(*e.g.*, *Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes
(*e.g.*, *Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)). Concepts the Supreme
Court has determined are patent eligible include physical and chemical
processes, such as "molding rubber products" (*Diamond v. Diehr*, 450 U.S.
175, 191 (1981)); "tanning, dyeing, making water-proof cloth, vulcanizing
India rubber, smelting ores" (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56
U.S. 252, 267–68 (1853))); and manufacturing flour (*Benson*, 409 U.S. at 69
(citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the
Supreme Court held that "[a] claim drawn to subject matter otherwise
statutory does not become nonstatutory simply because it uses a
mathematical formula." *Diehr*, 450 U.S. at 176; *see also id.* at 191 ("We

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view respondents' claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula."). The Supreme Court also indicated that a claim "seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, . . . and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment." *Id.* (citing *Benson* and *Flook*); *see also, e.g.*, *id.* at 187 ("It is now commonplace that an *application* of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection.").

If the claim is "directed to" an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where "we must examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221 (quotation marks omitted). "A claim that recites an abstract idea must include 'additional features' to ensure 'that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].'" *Id.* (quoting *Mayo*, 566 U.S. at 77).

In January 2019, the United States Patent and Trademark Office ("USPTO") published revised guidance on the application of § 101. 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) *updated by* USPTO, *October 2019 Update: Subject Matter Eligibility* (available at https://go.usa.gov/xp88j) (collectively, "the 2019 Guidance"); *see also* October 2019 Patent Eligibility Guidance Update, 84 Fed. Reg. 55942 (Oct. 18, 2019) (notifying public that October update was available). Under that guidance, we first look to whether the claim recites:

> (1) any judicial exceptions, including certain groupings of
> abstract ideas (i.e., mathematical concepts, certain methods of

organizing human activity such as a fundamental economic practice, or mental processes); and

(2) additional elements that integrate the judicial exception into a practical application (*see* MPEP § 2106.05(a)–(c), (e)–(h) (9th ed. 2018)).

2019 Guidance, 84 Fed. Reg. at 52–55. Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then look to whether the claim:

(3) adds a specific limitation beyond the judicial exception that is not "well-understood, routine, [and] conventional" in the field (*see* MPEP § 2106.05(d)); or

(4) simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

See 2019 Guidance, 84 Fed. Reg. at 56.

Analysis

We now apply the 2019 Guidance to the claims. Appellant does not argue claims 2–4, 6–11, and 13–18 separately from claim 1. Thus, claims 2–4, 6–11, and 13–18 stand or fall with claim 1. Although Appellant separately argues claims 5 and 12, Appellant argues only that they are not directed to abstract ideas. Accordingly, we address claims 1, 5, and 12 together. We then address separately independent claims 19 and 20, even though Appellant does not separately argue those claims.

Claims 1, 5, and 12

Step 2A, prong 1 — The Judicial Exception

Under step 2A, prong 1, of the 2019 Guidance, we first look to whether the claim recites a judicial exception, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of organizing

human activities such as a fundamental economic practice, or mental processes). 2019 Guidance, 84 Fed. Reg. at 52–54.

The Examiner concludes that the claim is directed to an abstract idea of a mental process. Specifically, the Examiner concludes that the limitations of claim 1 are analogous to the patent-ineligible steps of collecting information, analyzing the information, and displaying certain results, as in *Electric Power Group, LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016). Final Act. 2–3. We agree with the Examiner that claim 1 recites a judicial exception.

Limitations [i]–[iv] of claim 1, for example, recite the following language:

> selecting a spatio-temporal block of data from the seismic data;
>
> estimating signal-to-noise ratios of data in the spatio-temporal block of data, for a signal that is coherent with first seismic waves used to explore the underground formation and a noise that is not coherent with the first seismic waves;
>
> determining data-domain weights associated to the data, the data-domain weights being determined based on the estimated signal-to-noise ratios;
>
> generating a model of the signal and/or a model of the noise using the data-domain weights;

Appeal Br. 11 (Claims App'x). A person can select a spatio-temporal block of data, estimate signal-to-noise ratios of the data, determine data-domain weights associated to data based on estimated signal-to-noise ratios, and generate a model of the signal and/or the noise using the data-domain weights in her mind, or using a pen and paper. *See* Examiner's Answer, dated June 1, 2018 ("Ans.") 3. As such, the recited acts of selecting, estimating, determining, and generating here reasonably can be

characterized as involving mental processes, including evaluation and judgment.

The 2019 Guidance expressly recognizes mental processes as constituting an abstract idea. 2019 Guidance, 84 Fed. Reg. at 52. Accordingly, limitations [i]–[iv] recite a judicial exception to patent-eligible subject matter under step 2A, prong 1, of the 2019 Guidance.

Claim 5 recites the method of claim 1 further comprising "re-estimating the signal-to-noise ratios based on the model of the signal and/or the model of the noise," "recalculating the data-domain weights based on the re-estimated signal-to-noise ratios," and "updating the model of the signal and/or the model of the noise using the recalculated data-domain weights." Appeal Br. 12 (Claims App'x). Claim 12 ultimately depends from claim 1 and also requires re-estimating signal to noise ratios, recalculating data-domain weights, and updating the model. *Id.* at 14. Appellant argues the "re-estimating signal-to-noise ratios . . . is a step that calibrates seismic data processing based on the physical reality of acquiring data which is an overlap of signal and noise." *Id.* at 8. However, as we explain above, estimating the signal-to-noise ratios, calculating data domain weights, and generating a model are mental processes. The "re-estimating," "recalculating," and "updating" steps merely repeat analyzing the data and, therefore, are mental processes. Accordingly, claims 5 and 12 also recite a judicial exception under step 2A, prong 1 of the 2019 Guidance.

Step 2A, prong 2 — Integration into a Practical Application

Under step 2A, prong 2 of the 2019 Guidance, we consider whether the claim as a whole integrates the judicial exception into a practical application of the exception. Integration into a practical application requires

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an additional element or a combination of additional elements in the claim to "apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the exception." 2019 Guidance, 84 Fed. Reg. at 53–54; *see also id.* at 55 (setting forth exemplary considerations indicative that an additional element or combination of elements may have integrated the judicial exception into a practical application).

In addition to the selecting, estimating, determining, and generating limitations that are the abstract idea, claim 1 recites: (1) in the preamble, "processing seismic data recorded by receivers while exploring an underground formation"; (2) that the signal-to-noise ratios are "for a signal that is coherent with first seismic waves used to explore the underground formation and a noise that is not coherent with the first seismic waves"; and (3) "creating an image of the underground formation using the model of the signal and/or the model of the noise." These additional limitations, however, do not integrate the judicial exception into a practical application.

With respect to the preamble, the language reciting "seismic data recorded by receivers" is directed to gathering seismic data with receivers. Insignificant data gathering steps, however, "add nothing of practical significance to [an] underlying abstract idea." *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 716 (Fed. Cir. 2014).

To the extent that the preamble attempts to impose a meaningful limitation by reciting the abstract idea in the context of exploring underground formations, the "prohibition against patenting abstract ideas 'cannot be circumvented by attempting to limit the use of [the abstract idea] to a particular technological environment.'" *Bilski v. Kappos*, 561 U.S. 593,

610 (2010) (quoting *Diehr*, 450 U.S. at 191–92). In other words, the preamble language does nothing more than generally link the use of the judicial exception to a particular technological environment. Similarly, the limitations regarding the signal-to-noise ratios for a signal that is coherent with first seismic waves and a noise that is not coherent with the first seismic waves merely specify what signal and what noise are used in estimating the signal-to-noise ratio, but do not apply or use the judicial exception in a meaningful way. As with the preamble language, this limitation merely links the use of the judicial exception to a particular technological environment.

Further, contrary to Appellant's argument that the outcome of the claimed invention is not displaying certain measured or calculated values but an image of an underground formation explored using seismic waves, Appeal Br. 7, the limitation "creating an image of the underground formation using the model of the signal and/or the model of the noise" represents extra-solution activity because it is a mere nominal or tangential addition to the claim, i.e., a generic presentation of the collected and analyzed data. *See Elec. Power Grp.*, 830 F.3d at 1354; *see also SAP Am., Inc. v. InvestPic, LLC*, 890 F.3d 1016, 1021 (Fed. Cir. 2018) ("[M]erely presenting the results of abstract processes of collecting and analyzing information, without more (such as identifying a particular tool for presentation), is abstract as an ancillary part of such collection and analysis.") (citations omitted).

Finally, when viewed in combination, the additional elements in claim 1 do no more than automate the mental processes used in surveying

techniques. Thus, claim 1 appears to be no more than a drafting effort designed to monopolize the judicial exception.

For the same reasons as we explain in connection with claim 1, the "re-estimating," "recalculating," and "updating the model" steps recited in claims 5 and 12 also appear to be a drafting effort designed to monopolize the judicial exception.

Appellant argues that the claims seek to patent a particular implementation and recite an invention with sufficient specificity. Appeal Br. 5–7. These arguments are unpersuasive. As we explain above, the limitations of "selecting a spatio-temporal block of data from the seismic data," "estimating signal-to-noise ratios of data in the spatio-temporal block of data," "determining data-domain weights associated to the data," "generating a model of the signal and/or a model of the noise using the data-domain weights," and "creating an image of the underground formation using the model of the signal and/or the model of the noise," as recited in claim 1, are general in nature and lack a particular implementation that would impose a meaningful limit on the judicial exception. *See* Final Act. 2–3. The same can be said for the limitations of claims 5 and 12, which merely require "re-estimating," "recalculating," and "updating the model" based on the data.

Appellant also argues that the claims do not have a precluding effect relative to algorithmic aspects because they do not monopolize basic tools of scientific and technological work. Appeal Br. 9. This argument also is unpersuasive. The mere fact that the claims may not preempt all ways of creating an image of an underground formation by estimating the signal-to-noise ratios of seismic data, determining data-domain weights associated to

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the data, and generating a model, as recited in claim 1, for example, fails to persuade us that claim 1 (or claims 5 or 12) integrates the judicial exception into a practical application. *See Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) ("[T]he absence of complete preemption does not demonstrate patent eligibility."); *see also BSG Tech. LLC v. BuySeasons, Inc.*, 899 F.3d 1281, 1287 (Fed. Cir. 2018) (explaining that a claim does not become eligible merely because "it recites limitations that render it narrower than the abstract idea").

Appellant additionally asserts that the absence of prior art rejections evidences the novelty or inventiveness of the claims. Appeal Br. 6. However, "[t]he question . . . of whether a particular invention is novel is 'wholly apart from whether the invention falls into a category of statutory subject matter.'" *Diehr*, 450 U.S. at 190 (quoting *In re Bergy*, 596 F.2d 952, 961 (CCPA 1979) (emphasis omitted)); *see also Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 591 (2013) ("[G]roundbreaking, innovative, or even brilliant discovery does not by itself satisfy the § 101 inquiry."); *Mayo*, 566 U.S. at 90 (A novel and non-obvious claim directed to a purely abstract idea is, nonetheless, patent-ineligible.); *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016) ("[A] claim for a *new* abstract idea is still an abstract idea. The search for a § 101 inventive concept is thus distinct from demonstrating § 102 novelty."). Accordingly, Appellant's argument is not persuasive or error in the Examiner's rejection.

In sum, we find that claims 1, 5, and 12 do not integrate the judicial exception into a practical application. Accordingly, claims 1, 5, and 12 are directed to an abstract idea.

Step 2 B — Inventive Concept

Because claims 1, 5, and 12 are directed to an abstract idea, we evaluate the additional elements of those claims, individually and in combination, to determine whether the claims provide an inventive concept (i.e., whether the additional elements amount to significantly more than the exception itself). *See* 2019 Guidance, 84 Fed. Reg. at 56. In doing so, we consider whether the additional elements, individually and in an ordered combination, are well-understood, routine, and conventional. *Id.*; *see also Alice*, 573 U.S. 208 at 217.

The Examiner concludes, and we agree, that the claims do not contain any additional elements, individual or in combination, that amount to significantly more than the abstract idea. Final Act. 3–4.

As we explain above, claim 1 contains the additional elements of (1) in the preamble, "processing seismic data recorded by receivers while exploring an underground formation"; (2) that the signal-to-noise ratios are "for a signal that is coherent with first seismic waves used to explore the underground formation and a noise that is not coherent with the first seismic waves"; and (3) "creating an image of the underground formation using the model of the signal and/or the model of the noise."

Regarding the preamble, the language reciting "seismic data recorded by receivers while exploring an underground formation" is directed to gathering seismic data by receivers. The "Background" of the Specification indicates that "[a]fter seismic waves are injected into the explored underground structure, seismic receivers detect the reflected energy." Spec. ¶ 3. Nothing in the Specification indicates that the receivers are anything other than generic receivers. Routine data-gathering steps,

however, are "insufficient . . . to constitute an inventive concept." *Solutran, Inc. v. Elavon, Inc.*, 931 F.3d 1161, 1169 (Fed. Cir. 2019) (citations omitted).

The limitation regarding the signal that is coherent with first seismic waves and noise that is not coherent with first seismic waves also fails to recite an inventive concept. The Specification's "Background" states that, during underground exploration, "seismic receivers detect the reflected energy (a signal, which may be coherent with the injected waves), and undesirable noise." Spec. ¶ 3. The "Background" continues that "[s]ome of the noise is predictable and coherent with the signal in some domains, while unpredictable and incoherent with the signal in other domains." *Id.* ¶ 4. It further explains that "[n]oise that is coherent in one domain but incoherent in another may be attenuated using methods for removing incoherent noise, applied in the domain in which the noise is incoherent." *Id.* In view of these disclosures, we determine that a signal that is coherent with first seismic waves and noise that is not coherent with first seismic waves is a concept that was merely well-understood, routine, and conventional during underground exploration.

As we explain above, the limitation "creating an image of the underground formation using the model of the signal and/or the model of the noise" represents extra-solution activity because it is a mere nominal or tangential addition to the claim, i.e., a generic presentation of the collected and analyzed data. *See Elec. Power Grp.*, 830 F.3d at 1354; *see also SAP America, Inc. v. InvestPic, LLC*, 890 F.3d at 1021 ("[M]erely presenting the results of abstract processes of collecting and analyzing information, without

more (such as identifying a particular tool for presentation), is abstract as an ancillary part of such collection and analysis.") (citations omitted).

Finally, when viewed in an ordered combination, the additional elements in claim 1 do no more than automate the mental processes used in surveying techniques. The additional elements, individually and in combination, therefore, fail to provide an inventive concept such that the claims recite "significantly more" than an abstract idea.

Appellant argues that the claims improve seismic exploration technology in that they "yield accurate predictions in the presence of irregularly distributed data and/or for signals that have a moderate degree of aliasing." Appeal Br. 8. This argument is not persuasive.

First, we note that claims 1, 5, and 12 do not recite or require "yield[ing] accurate predictions in the presence of irregularly distributed data and/or for signals that have a moderate degree of aliasing," as Appellant argues. In any event, as the Examiner finds, it appears that any improvements the claimed invention provide are due to the judicial exception itself. Ans. 5. "It has been clear since *Alice* that a claimed invention's use of the ineligible concept to which it is directed cannot supply the inventive concept that renders the invention 'significantly more' than that ineligible concept." *BSG Tech.*, 899 F.3d at 1290.

In summary, we have carefully considered Appellant's arguments but are not persuaded of reversible error in the Examiner's rejection of claims 1–18.

Claim 19

Appellant does not present separate arguments for independent claim 19. Appeal Br. 5–9. Claim 19 is similar to claim 1 (our analysis of

which applies equally here) but recites an apparatus, rather than a method, and the apparatus includes, *inter alia*, "an input/output interface" and "a data processing unit." These additional elements fail to integrate the abstract idea into a practical application. The Examiner finds these limitations are recited at a high level of generality and do not add significantly more to the judicial exception. Final Act. 4. The Examiner further finds that these elements are generic computing devices that perform generic functions. *Id.* at 3–4. We agree.

The Specification does not indicate that the input/output interface and data processing unit are anything other than generic computing devices. Spec. ¶¶ 61–64. Using generic computer elements to perform an abstract idea does not integrate an abstract idea into a practical application. *See* 2019 Guidance, 84 Fed. Reg. at 55. Moreover, "the mere recitation of a generic computer cannot transform a patent-ineligible abstract idea into a patent-eligible invention." *Alice*, 573 U.S. at 223; *see also FairWarningIP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1096 (Fed. Cir. 2016) (citation omitted) ("[T]he use of generic computer elements like a microprocessor or user interface do not alone transform an otherwise abstract idea into patent-eligible subject matter").

On the record before us, we are not persuaded that the input/output interface and data processing unit of claim 19 integrates the abstract idea into a practical application. Nor are we persuaded that the additional elements are anything more than well-understood, routine, and conventional so as to impart subject matter eligibility to claim 19. Therefore, we affirm the Examiner's rejection of claim 19.

Claim 20

Appellant does not present separate arguments for independent claim 20. Appeal Br. 5–9. Claim 20 is similar to claim 1 (our analysis of which applies equally here) but recites a non-transitory computer readable medium storing executable codes that, when executed by a computer, performs a method similar to that of claim 1. This amounts to nothing more than instructions to implement the abstract idea on a computer, which fails to integrate the abstract idea into a practical application. *See* 2019 Guidance, 84 Fed. Reg. at 55. Additionally, using instructions to implement an abstract idea on a generic computer "is not '*enough*' to transform an abstract idea into a patent-eligible invention." *Alice*, 573 U.S. at 226. Therefore, we affirm the rejection of claim 20 for the same reason discussed above with regard to the rejection of claim 1.

CONCLUSION

The Examiner's rejection of claims 1–20 under 35 U.S.C. § 101 is affirmed.

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–20	101	Eligibility	1–20	

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