



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/704,050	12/13/2012	Joris Vermeesch	20150087-04	6203
22878	7590	11/15/2019	EXAMINER	
Agilent Technologies, Inc. Global IP Operations 5301 Stevens Creek Blvd Santa Clara, CA 95051			CLOW, LORI A	
			ART UNIT	PAPER NUMBER
			1631	
			NOTIFICATION DATE	DELIVERY MODE
			11/15/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

Agilentdocketing@cpaglobal.com
ipopsadmin@agilent.foundationip.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JORIS VERMEESCH, THIERRY VOET, and
MASOUD ZAMANI ESTEKI¹

Appeal 2019-004597
Application 13/704,050
Technology Center 1600

Before ERIC B. GRIMES, RACHEL H. TOWNSEND, and
DAVID COTTA, *Administrative Patent Judges*.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) involving claims to a method for genotyping a cell, which have been rejected as ineligible for patenting. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Appellant identifies the real parties in interest as Katholieke Universiteit Leuven and Agilent Technologies, Inc. Appeal Br. 4. We use the word Appellant to refer to “applicant” as defined in 37 C.F.R. § 1.42(a).

STATEMENT OF THE CASE

The Specification discloses a “method . . . for single cell or dual-cell haplotyping” that includes a step of “[s]implify[ing] interpretation of the generated single- and/or dual-cell ‘raw’ haplotypes . . . by reassigning the allelic allocation of one or more genetic polymorphisms and/or intermediate regions, based on the information of neighboring genetic polymorphisms.” Spec. 4–5. In one embodiment, the method includes “reassigning the allelic allocation of haplotype blocks smaller than a certain amount of genetic polymorphisms (= threshold).” *Id.* at 5. The “reassigning . . . is done by making use of the grandparental origin of the first haplotype blocks to the left and right of the small haplotype block which are larger than the threshold.” *Id.* Specifically, “haplotype blocks which are smaller, in amount of genetic polymorphisms, than a certain threshold T_1 are assigned to the first haplotype block on the left or right side of the haplotype block larger than the threshold T_1 only if these two haplotype blocks are assigned to the same grandparent.” *Id.*

In a second embodiment, “the reassigning . . . is based on a digital image signal-processing technique to reduce noise.” *Id.* at 6. More specifically, “a ‘1D median filter’ . . . is applied in this non-linear smoothing algorithm.” *Id.* “The technique relies on a sliding window (expressed in amount of genetic polymorphisms) and the adjustment of allelic assignments (expressed in binary format) within each window. The main idea of the median filter is to run through the binary signal entry by entry, replacing each entry with the median of neighboring entries.” *Id.* at 6–7.

Claims 21, 23, 24, and 27–35 are on appeal. Claim 21, reproduced below, is illustrative:

21. A method for genotyping a cell, the method comprising:

(a) obtaining a haplotype from the DNA of one or two cells, wherein the haplotype comprises haplotype blocks containing one or more polymorphisms that have been assigned as originating from the first or second homologous chromosome of a parent;

(b) smoothing the haplotype of the one or two cells to produce a smoothed haplotype using a computer, wherein the smoothing comprises:

i. determining the number of polymorphisms in each haplotype block;

ii. identifying haplotype blocks that have below a threshold number of polymorphisms; and

iii. reassigning the origin of haplotype blocks that have below the threshold number of polymorphisms to origins of neighboring haplotype blocks that have above the threshold number of polymorphisms; or

1) determining a window size for a median filter;

2) applying the median filter to the haplotype; and

3) reassigning the origin of at least one of the one or more polymorphisms that is inside said window to a median value of the window;

(c) analyzing the smoothed haplotype for inherited genetic aberrations; and

(d) sorting the one or more cells into the one or more cells comprising an inherited genetic aberration if the inherited genetic aberration was detected in the smoothed haplotype.

OPINION

Claims 21, 23, 24, and 27–35 stand rejected under 35 U.S.C. § 101 “because the claimed invention is directed to an abstract idea without significantly more.” Ans. 3. With reference to claim 21, the Examiner finds that the step of “smoothing the haplotype” comprising sub-steps (i), (ii), and (iii); the step of “analyzing” the smoothed haplotype; and the step of “sorting” the cells are “abstract idea[s] of the type grouped as ‘mental processes’ because said operations could be performed in the mind, but for the recitation ‘using a computer’ to perform ‘smoothing’.” *Id.* at 4–5.²

Specifically, the Examiner finds that

“determining” a number of polymorphisms; “identifying haplotype blocks” and “reassigning the origin of haplotype blocks that have below a threshold . . .” are steps that are recited at a high level of generality and can reasonably be performed in the human mind or *via* pen and paper operation, wherein one can envision looking at said data and “determining”, “identifying” and “reassigning”.

Id. at 5. The Examiner also finds that “‘analyzing’ can also . . . be performed in the mind, as no specific operation for analysis is claimed” and “‘sorting’ is a step whereby one can envision using the acquired data to place cells into classes, for example, or visually sort based on data.” *Id.*

The Examiner also finds that claim 21 does not include additional elements that integrate the abstract idea into a practical application. *Id.* at 5–6. Specifically, the Examiner finds that claim 21 recites using a generic computer, and recites “obtaining” a haplotype, “which is a step of merely

² The Examiner did not analyze the alternative smoothing sub-steps (1), (2), and (3) because they are not required if sub-steps (i), (ii), and (iii) are performed. Ans. 6.

getting data via obtaining DNA information from cells to implement in the recited judicial exception.” *Id.* at 6.

Finally, the Examiner finds that “obtaining a haplotype” is a well-known, routine, and conventional activity, as shown by Renwick.³ Ans. 8. The Examiner concludes that this conventional data-gathering step, and the generic computer elements recited, do not provide an inventive concept that would render the claimed method patent-eligible, and therefore “the claims are non-statutory.” *Id.* at 9.

Appellant argues that “obtaining a haplotype,” as required by claim 21, requires isolating and sequencing DNA; “this is not a mental process.” Reply Br. 4. Appellant also argues that “the present claims are directed to a practical application (method) by which cells are genotyped.” Appeal Br. 11; Reply Br. 7. Specifically, “[t]he present method identifies and sorts cells that comprise an inherited genetic aberration This has significant practical applications in many fields, including the field of reproductive biology.” Appeal Br. 12–13; Reply Br. 10. Appellant argues that the “method of the present claims . . . improves another technical field, including the field of *in vitro* fertilization because the present methods allow to accurately and expeditiously determine whether a preimplantation embryo carries inherited genetic aberration.” Appeal Br. 18.

Finally, Appellant argues that “Renwick et al. does not show that the present method is routine or conventional, because the combination of the

³ Renwick et al., Proof of principle and first cases using preimplantation genetic haplotyping – a paradigm shift for embryo diagnosis, *Reproductive BioMedicine Online* 13:110–119 (2006).

steps as provided by present claim 21 and its dependent claims is not disclosed or suggested by Renwick et al.” *Id.* at 17. Appellant also cites the Vermeesch Declaration⁴ as evidence that “the methods of the present claims were not routine or conventional at the time the inventors have developed and disclosed the methods in the present patent application.” *Id.* at 19.

An invention is patent-eligible if it claims a “new and useful process, machine, manufacture, or composition of matter.” 35 U.S.C. § 101. However, the Supreme Court has concluded that “[l]aws of nature, natural phenomena, and abstract ideas” are not patentable under 35 U.S.C. § 101. *See, e.g., Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014).

To determine if a claim falls into an excluded category, we apply a two-step framework, described in *Mayo* and *Alice*. *Id.* at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). We first determine what the claim is “directed to.” *See Alice*, 573 U.S. at 219 (“On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk.”); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) (“Claims 1 and 4 in petitioners’ application explain the basic concept of hedging.”).

Patent-ineligible abstract ideas include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611), mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)), and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)). In contrast, patent-eligible inventions include

⁴ Declaration under 37 C.F.R. § 1.132 of Joris Vermeesch, filed May 8, 2018.

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 claimed method employed 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 187; *see also id.* at 191 (“We 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 noted, however, 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, 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, and “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 (internal 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 (alterations in original)).

“[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention.” *Id.*

The PTO has published revised guidance on the application of § 101. *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (January 7, 2019) (“Revised Guidance”). Under that guidance, we first determine 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)).

See 84 Fed. Reg. at 54–55. Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then determine whether the claim:

(3) adds a specific limitation beyond the judicial exception that is not a “well-understood, routine, conventional activity” 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 84 Fed. Reg. at 56.

Revised Guidance Step 2(A), Prong 1

Following the Revised Guidance, we first consider whether the claims recite a judicial exception, such as a mental process. A mental process is one that can be “performed in the human mind (including an observation, evaluation, judgment, opinion).” 84 Fed. Reg. at 52.

Although claim 21 recites “using a computer” to carry out the smoothing steps, this recitation by itself does not distinguish the steps of the claim from mental processes. If a claim “covers performance in the mind but for the recitation of generic computer components, then it is still in the mental processes category unless the claim cannot practically be performed in the mind.” 84 Fed. Reg. at 52, n.14. As discussed below, most of the steps of claim 21 can practically be performed in the mind.

Claim 21 recites “smoothing the haplotype” by carrying out sub-steps (i), (ii), and (iii).⁵ Sub-step (i) recites “determining the number of polymorphisms in each haplotype block.” Determining the number of members in a set can be carried out by simply counting those members; in this case, counting the polymorphisms in each haplotype block. Sub-step (i) therefore recites a mental step.

Sub-step (ii) recites “identifying haplotype blocks that have below a threshold number of polymorphisms.” This step simply requires observing whether the number of polymorphisms in each haplotype block is above or

⁵ As the Examiner noted, steps (1), (2), and (3) of claim 21 are not necessary to practice the claimed method because they are an alternative to steps (i), (ii), (iii). Ans. 6. We therefore do not address whether claim 21 would be patent-eligible if it were limited to using the “median filter” smoothing method.

below another number (a threshold). Sub-step (ii) therefore recites a mental step.

Sub-step (iii) recites “reassigning the origin of haplotype blocks that have below the threshold number of polymorphisms to origins of neighboring haplotype blocks that have above the threshold number of polymorphisms.” This step assigns meaning to the observation carried out in sub-step (ii): haplotype blocks with fewer polymorphisms than the threshold are judged to be incorrectly assigned, so they are reassigned to the origin of neighboring haplotype blocks that have more than the threshold number of polymorphisms. Exercising judgment, as recited in step (iii), is a mental step.

Claim 21 next recites “analyzing the smoothed haplotype for inherited genetic aberrations.” Analyzing, or evaluating, data can be carried out mentally, so step (c) of claim 21 is a mental step.

Finally, claim 21 recites “sorting the one or more cells into the one or more cells comprising an inherited genetic aberration if the inherited genetic aberration was detected in the smoothed haplotype.” This step assigns meaning to the analyzing carried out in step (c): if an inherited genetic aberration was indicated by the analysis, then the cell is “sorted . . . into,” or considered as, one that comprises an inherited genetic aberration.⁶ Step (d) of claim 21 therefore is a mental step.

⁶ In some contexts, “sorting” one or more cells would include physically separating a cell from other cells. Here, however, the Specification describes obtaining a cell’s haplotype to include the steps of “[l]ys[ing] the single cell,” before amplifying its DNA, genotyping, and reconstructing its haplotype. Spec. 4–5. Appellant confirms that obtaining a cell’s haplotype

In summary, each of steps (b)(i), (b)(ii), (b)(iii), (c), and (d) of claim 21 encompasses a “concept[] performed in the human mind (including an observation, evaluation, judgment, opinion)”; i.e., a mental process. 84 Fed. Reg. at 52. Thus, we agree with the Examiner that claim 21 recites an abstract idea.

Revised Guidance Step 2(A), Prong 2

Following the Revised Guidance, we next consider whether “the claim as a whole integrates the recited judicial exception into a practical application of the exception”; i.e., whether the claim “appl[ies], rel[ies] on, or use[s] the judicial exception in a manner that imposes a meaningful limit on the judicial exception.” 84 Fed. Reg. at 54. This analysis includes “[i]dentifying whether there are any additional elements recited in the claim beyond the judicial exception(s)” and “evaluating those additional elements individually and in combination to determine whether they integrate the exception into a practical application.” *Id.* at 54–55.

Here, claim 21 requires an initial step of “obtaining a haplotype from the DNA of one or two cells, wherein the haplotype comprises haplotype blocks containing one or more polymorphisms that have been assigned as originating from the first or second homologous chromosome of a parent.” This step generates the haplotype, from one or two cells, that is smoothed, analyzed, and sorted in the subsequent steps of the claimed method. The step of “obtaining a haplotype” thus is merely a data-gathering step, not a

involves isolating and sequencing its DNA. Reply Br. 4. Thus, the cell that is “sorted” in the final step of claim 21 no longer physically exists, and the sorting refers instead to classifying it as one comprising a genetic aberration.

practical application of the mental steps of smoothing, analyzing, and sorting the haplotype. Step (a) of claim 21 does not integrate the recited abstract idea into a practical application. *See* 84 Fed. Reg. at 55, n. 31 (“insignificant extra-solution activity” includes “mere data gathering such as a step of obtaining information about credit card transactions”); *see also Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 716 (Fed. Cir. 2014) (“‘data-gathering steps,’ *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1370 (Fed. Cir. 2011), . . . add nothing of practical significance to the underlying abstract idea.”).

Claim 21 also states that the method “us[es] a computer” to smooth the haplotype via steps (b)(i), (b)(ii), and (b)(iii). However, the claim requires only a generic “computer” to carry out the recited functions; it does not recite any specific hardware or software configuration for doing so. Consistent with claim 21, the Specification describes the alternative smoothing algorithms, and states that one “was designed in Tinn-R 2.2.0.2 and R 2.8.0” and the other “was designed in Matlab,” Spec. 16–17, but does not describe any unconventional computer functions required in order to practice the claimed method.

Thus, the limitation of “using a computer” does not require any particular machine or manufacture, but instead is simply an “instruction[] to implement an abstract idea on a computer, or merely uses a computer as a tool to perform an abstract idea.” 84 Fed. Reg. at 55. Because claim 21 recites an abstract idea and does not integrate the abstract idea into a practical application, it is directed to an abstract idea.

Revised Guidance Step 2(B)

Finally, the Revised Guidance directs us to consider whether claim 21 includes “additional elements . . . [that] provide[] ‘significantly more’ than the recited judicial exception.” 84 Fed. Reg. at 56. The Revised Guidance states that an additional element that “simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception, . . . is indicative that an inventive concept may not be present.” *Id.*

Here, as discussed above, the additional elements recited in claim 21, beyond the abstract idea to which it is directed, are the data-gathering step of “obtaining a haplotype” and the use of a generic computer. The recited computer, however, does not provide “significantly more” than the abstract idea, because “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.

With regard to the step of “obtaining a haplotype,” the Revised Guidance instructs us to reevaluate additional elements that were found to be insignificant extra-solution activity under Step 2(A) of the analysis to determine whether those elements are “unconventional or otherwise more than what is well-understood, routine, conventional activity in the field.” 84 Fed. Reg. at 56. The Guidance states, for example, that

when evaluating a claim reciting an abstract idea such as a mathematical equation and a series of data gathering steps that collect a necessary input for the equation, an examiner might consider the data gathering steps to be insignificant extra-solution activity in revised Step 2A, and therefore find that the judicial exception is not integrated into a practical application.

However, when the examiner reconsiders the data gathering steps in Step 2B, the examiner could determine that the combination of steps gather data in an unconventional way and therefore include an “inventive concept,” rendering the claim eligible at Step 2B.

Id. (footnote omitted).

Here, the Examiner points to Renwick as evidence of “the routine nature of said steps to ‘obtain a haplotype from the DNA of cells.’” Ans. 8–9. Renwick states that “[p]reimplantation genetic haplotyping (PGH) proof-of-principle was demonstrated” and “enabled identification of the paternal haplotype.” Renwick 110, abstract. Appellant’s Specification acknowledges that Renwick’s method “enabl[ed] the detection of high-risk and low-risk haplotypes.” Spec. 2.

The Specification also provides evidence that all of the steps involved in “obtaining a haplotype” were known in the art, and could be carried out using established products and methods. The Specification states that obtaining DNA from a single cell can be done using “any single cell lysis, DNA amplification . . . and DNA purification method.” Spec. 15. The Specification also states that “[t]o enable genome-wide genetic polymorphism typing and subsequent haplotyping of single human cells, Affymetrix GeneChip Human Mapping 250K NspI arrays are performed . . . according to manufacturer’s instructions” and “interpreted using the Dynamic Model algorithm.” *Id.* (citing “Di et al. 2005”). According to the Specification, “[a]lternatives include any genome-wide SNP-typing platform (including lower and higher resolution platforms from Affymetrix . . . and Illumina . . .) with or without modifications to the manufacturer’s instructions and subsequent genotyping software.” *Id.* “Alternatives also

include any massively parallel sequencing approaches and the use of any type of polymorphic genetic variation for single- or dual-cell haplotyping.”
Id.

The Specification also states that “[g]enome-wide haplotype reconstruction of the single-cell or dual-cell derived genotype is performed with the MERLIN algorithm.” *Id.*, citing “Abecasis et al. 2002.” “Alternatives include any haplotyping software (Stephens and Donnelly 2003; Gao et al. 2009; Handyside et al. 2009).” *Id.*

The evidence of record therefore supports the Examiner’s conclusion that claim 21 does not recite additional elements other than well-known, routine, and conventional activities. Ans. 8. We agree with the Examiner that the combination of elements recited in the method of claim 21 does not amount to significantly more than the judicial exception itself, and under 35 U.S.C. § 101 the claimed method is ineligible for patenting.

Appellant’s Arguments

Appellant argues that the Examiner alleges that steps (b) and (c) of claim 21 are directed to the “mental processes” type of abstract idea. Reply Br. 4. “Furthermore, in connection with step a) of claim 21, which recites obtaining a haplotype from the DNA of one or two cells, the Examiner deemed this step as data gathering.” *Id.* Appellant argues that “it is impossible to ‘obtain a haplotype from the DNA of one or two cells’ in one’s mind and this is not a mental process.” *Id.*

The Examiner’s analysis, however, is clearly based on steps (b), (c), and (d) being mental steps, and step (a) being an “additional element[]” to be considered in step 2A, prong two, regarding whether the abstract idea is

integrated into a practical application. *See* Ans. 4–6. Appellant’s argument therefore does not point out any defect in the rejection.

Appellant also argues that “the present claims are directed to a practical application (method) by which cells are genotyped.” Appeal Br. 11. More specifically, Appellant argues that

claim 21 recites a method for genotyping a cell, such as for example an *in vitro* fertilized cell-blastomer. Cells which comprise inherited genetic aberrations are not suitable for implantation. The present method identifies and sorts cells that comprise an inherited genetic aberration, as recited in present claim 21 and its dependent claims. This has significant practical applications in many fields, including the field of reproductive biology.

Id. at 12–13.

Appellant points out that “[i]n *Classen Immunotherapies, Inc. v. Biogen Idec*, 659 F.3d 1057 (Fed. Cir. 2011), the court has determined that claims directed to an immunization method were patent-eligible. In the *Classen* case, an immunization step integrated an abstract idea into a specific process.” *Id.* at 13.

These arguments are not persuasive, because claim 21 does not include any step of applying the knowledge that a smoothed haplotype includes an inherited genetic aberration in any real-world way. That is, the final step of claim 21 is “sorting the one or more cells into the one or more cells comprising an inherited genetic aberration if the inherited genetic aberration was detected in the smoothed haplotype.” The “one or more cells” referred to in this step, however, is/are the one or more cells for which a haplotype was obtained from its/their DNA. *See* claim 21, step (a).

Obtaining a haplotype from a cell's DNA requires isolating the DNA from the cell, and the specific cell is destroyed in the process of isolating its DNA. *See, e.g.*, Spec. 4–5. Thus, the “sorting” recited in claim 21 cannot refer to separating a particular cell from other cells, and must instead refer to classifying the cell as one that included DNA having an inherited genetic aberration. *See supra* n. 6 (explaining why the “sorting” step does not require physically separating cells). In other words, the result of the claimed method is information. Claim 21 does not require any application of that information.

In this way, claim 21 differs from the claims of the '139 and '739 patents in *Classen*, which included a step of immunizing according to a particular immunization schedule. *Classen*, 659 F.3d at 1060–61. Those claims were held to be patent-eligible. *Id.* at 1065. Rather, claim 21 is similar to claim 1 of the '283 patent in *Classen*, which was found patent-ineligible. Claim 1 of the '283 patent required “determining whether an immunization schedule affects the incidence or severity of a chronic immune-mediated disorder” by comparing a treatment group of mammals with a control group. *Id.* at 1061. As the court summarized, “[t]he '283 claims do not include putting this knowledge to practical use. . . . In contrast, the claims of the '139 and '739 patents require the further act of immunization in accordance with a lower-risk schedule, thus moving from abstract scientific principle to specific application.” *Id.* at 1067–68. The court thus concluded that “the '283 claims do not state a patent-eligible process.” *Id.* at 1065.

Like claim 1 of the '283 patent in *Classen*, claim 21 requires determining certain information; specifically, whether a smoothed haplotype from a particular cell (or two) contains an inherited genetic aberration, and classifying it as such if an inherited genetic aberration is detected. However, the claimed method does not include putting that information to any practical use. Because claim 21 uses mental steps to produce information, but does not practically apply that information, it does not integrate the mental steps into a practical application.

Appellant argues that “Renwick et al. does not show that the present method is routine or conventional, because the combination of the steps as provided by present claim 21 and its dependent claims is not disclosed or suggested by Renwick et al.” Appeal Br. 17.

This argument is unpersuasive because the issue with respect to patent-eligibility is not whether the claimed process as a whole was known in or suggested by the prior art, but whether, *in addition to* the judicial exception, the claimed process includes elements that go beyond well-understood, routine, and conventional activity known to those in the field. *See Mayo*, 566 U.S. at 79–80. Here, as discussed above, both Renwick and Appellant’s Specification demonstrate that the “obtaining a haplotype” step of claim 21 requires only well-understood, routine, and conventional activity.

Finally, Appellant points to the Vermeesch Declaration as evidence that the claimed method has advantages over prior methods of testing for genetic abnormalities in embryos. Appeal Br. 17. Appellant also argues that “[u]sing that the claimed method, the inventors discovered a new

phenomenon, heterogoneic cell division in which the embryo segregates maternal and paternal chromosomes to different cells.” *Id.* at 18.

Appellant argues that

the genotyping method of the present claims which comprises a step of smoothing a haplotype of one or more cells improves another technical field, including the field of *in vitro* fertilization because the present methods allow to accurately and expeditiously determine whether a preimplantation embryo carries inherited genetic aberration.

Id.

These arguments are unpersuasive. Even if the claimed method more accurately genotypes a particular cell, or allows discovery of a new phenomenon of cell division, or can be used to identify pre-implantation embryos free of certain genetic defects, the method defined by claim 21 produces only information. The claimed method does not include a step of applying that information in any practical, real-world way. The claim therefore fails to “mov[e] from abstract scientific principle to specific application.” *Classen*, 659 F.3d at 1067–68.

For the reasons discussed above, we affirm the rejection of claim 21 under 35 U.S.C. § 101. Claims 23, 24, and 27–35 fall with claim 21 because they were not argued separately. 37 C.F.R. § 41.37(c)(1)(iv).

DECISION SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
21, 23, 24, 27–35	101	Eligibility	21, 23, 24, 27–35	

Appeal 2019-004597
Application 13/704,050

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). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED