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TERRILE, CANNATTI & CHAMBERS, LLP
NXP
6501 William Cannon Drive West
AUSTIN, TX 78735

EXAMINER	
NGHIEM, MICHAEL P	

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DAVID A. HAYNER

Appeal 2017-009701
Application 12/838,633
Technology Center 2800

Before CATHERINE Q. TIMM, DEBRA L. DENNETT, and LILAN REN, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL[1]

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[2] appeals from the Examiner's decision to reject claims 1–4, 6–13, 17, 18, and 21–25 under 35 U.S.C. § 101 as directed to non-statutory subject matter. We have jurisdiction under 35 U.S.C. § 6(b).

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[1] In explaining our Decision, we cite to the Specification of September 7, 2016 (Spec.), Final Office Action of July 14, 2016 (Final), Appeal Brief of March 3, 2017 (Appeal Br.), Examiner's Answer of May 8, 2017 (Ans.), and Reply Brief of July 7, 2017 (Reply Br.).

[2] Appellant identifies the real party in interest as NXP USA, Inc. Appeal Br. 1.

We AFFIRM-IN-PART.

The claims are directed to a packaged multi-sensor device (*see, e.g.*, claims 1 and 21–24) and a method of validating a first measurement value (*see, e.g.*, claim 13).

Claim 1 is illustrative of the claims directed to the packaged multi-sensor device:

> 1. A packaged multi-sensor device for measuring and validating one or more inertial signals, comprising:
>
> a plurality of sensors arranged to measure at least first, second, and third inertial signals in different domains, the plurality of sensors comprising
>
> a first Micro-Electro-Mechanical Systems (MEMS) sensor device for measuring the first inertial signal in a first domain,
>
> a second MEMS sensor device for measuring the second inertial signal in a second different domain, and
>
> a third MEMS sensor device for measuring the third inertial signal in a third different domain; and
>
> a processing unit for generating first and second estimated values for the first inertial signal based on, respectively, the second and third inertial signals, and for comparing the first and second estimated values for the first inertial signal to the first inertial signal in order to validate the first inertial signal,
>
> where the processing unit generates the first estimated value by computing a first estimated x-axis linear acceleration value from the second inertial signal which comprises a measured roll angular velocity value Ω_x, and
>
> where the processing unit generates the second estimated value by computing a second estimated x-axis linear

> acceleration value from the third inertial signal which comprises a measured y-axis linear acceleration value.

Appeal Br. 16 (claims appendix) (formatting added).

Claim 13 is illustrative of the claims directed to a method of validating a first measured value:

> 13. A method for validating a first measured value associated with a platform without using external reference information, comprising:
>
> measuring a plurality of inertial values in a plurality of domains, comprising a first measured value in a first domain and at least a second measured value in a second different domain, by:
>
> reading a y-axis acceleration signal value A_Y from a first linear accelerometer sensor;
>
> reading a z-axis acceleration signal value A_Z from a second linear accelerometer sensor; and
>
> reading a roll angular velocity signal value Ω_X from one or more gyro sensors;
>
> transforming at least the second measured value in the second different domain into a first estimated value in the first domain by calculating a first estimated y-axis acceleration signal value A_{Y1} using the roll angular velocity signal value Ω_X, and calculating a second estimated y-axis acceleration signal value A_{Y2} using the z-axis acceleration signal value A_Z; and
>
> comparing the first and second estimated y-axis acceleration signal values to the y-axis acceleration signal value A_Y measured from the first linear accelerometer sensor to assess a validity measure for the y-axis acceleration signal value A_Y.

Appeal Br. 19 (claims appendix).

OPINION

We agree with the Examiner that the method claims are directed to non-statutory subject matter because they do not amount to significantly more than an abstract idea embodied in a mathematical algorithm run on a computer processing unit. Final 3–6; Ans. 2–12. However, we agree with Appellant that the Examiner failed to adequately consider the combination of sensors within the package in the combination when determining the device claims were non-statutory. Appeal Br. 9–10. Thus, we sustain the rejection of claims 13, 17, and 18, but we do not sustain the rejection of claims 1–4, 6–12, and 21–25. Our reasons follow.

35 U.S.C. § 101 states that "[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." But even if a claim at first blush appears to be directed to one of the statutory classes of invention listed in § 101, it may be not eligible for a patent. "Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work." *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 70–72 (2012) (quoting *Diamond v. Diehr,* 450 U.S. 175, 185 (1981) (quoting *Gottschalk v. Benson,* 409 U.S. 63, 67 (1972)). Thus, a claim that due to the drafting efforts of the applicant appears to fit into one of the statutory classes, but, in fact, would wholly pre-empt others from making and using

the basic tools of scientific and technological work is not patentable. *Alice Corp. Pty. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2354–55, 57 (2014).

In *Alice*, the Court extended a framework that had been used in *Mayo* for distinguishing claims pre-empting laws of nature, natural phenomena, and abstract ideas from claims amounting to patent-eligible applications of those concepts. *Alice*, 134 S. Ct. at 2355. As stated in *Alice*:

> First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts. If so, we then ask, "what else is there in the claims before us?" To answer that question, we consider the elements of each claim both individually and as an ordered combination to determine whether the additional elements transform the nature of the claim into a patent-eligible application. We have described step two of this 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.

Alice, 134 S. Ct. at 2355 (internal quotations marks and citations to *Mayo* omitted).

Because "at some level, all inventions embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas," one must take care to strike the correct balance when considering the question of patent eligibility. *Alice*, 134 S. Ct. at 2354 (internal quotation marks omitted).

The *Alice* analysis begins with the question: "whether the claims at issue are directed to a patent-ineligible concept." *Alice*, 134 S. Ct. at 2355. This "first-stage filter is a meaningful one, sometimes ending the § 101 inquiry." *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1346 (Fed. Cir. 2017) (quoting *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016)). "[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.'" *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (quoting *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015)).

One way to determine what a claim is "directed to" is to focus on the claimed advance over the prior art. *Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1375 (Fed. Cir. 2016). The advance cannot wholly reside in patent-ineligible concepts themselves such as mathematical formulas and algorithms. *See Parker v. Flook,* 437 U.S. 584, 591 (1978) ("The process itself, not merely the mathematical algorithm, must be new and useful."). The advance must be an improvement in some combination of structures or processing steps employing the algorithm such that the apparatus or process as a whole is improved.

We first consider claim 1. Claim 1 is directed to a packaged multi-sensor device that includes three MEMS sensor devices and a processing unit. Each of the three MEMS sensor devices measures inertial signals in different domains. The Specification describes the sensor devices as measuring inertial effects, such as linear acceleration in a given direction (e.g., x-axis, y-axis, z-axis directions) and roll angular velocity. Spec. ¶ 9. Thus, we interpret claim 1 as measuring these types of inertial effects. The inertial signals from the inertial effects include a measured roll angular velocity value (second inertial signal) and a measured y-axis linear acceleration value (third inertial signal). Claim 1 ("where" clauses). By implication, the second and third sensors are those that measure roll angular

velocity, such as a gyroscope, and y-axis linear acceleration, such as a y-axis accelerometer.

The three sensors gather data that is used in the processing unit. What occurs in the processing unit amounts to a procedure for solving mathematical problems, which the courts have called an algorithm, and which is in the realm of an abstract idea. *Flook,* 437 U.S. at 589. The question is whether the combination of sensors and processing unit in a package add something more such that the claim does not pre-empt others from using the algorithm itself. One way to consider the question is to consider the level of integration between the structures of the device and the abstract idea and the improvement that results.

The claims in *Diamond v. Diehr*, 450 U.S. 175 (1981) provide an example of an instance where the claims as a whole were not directed to an abstract idea, but improved a process as a whole.

Diehr's claims were directed to a method of operating a rubber-molding press. *Id.* at 177 n.2 (1981). *Diehr* characterized the improvement as residing in the process of constantly measuring the actual temperature inside the mold, recalculating the ideal cure time, and automatically opening the press when the ideal cure time equaled the actual time elapsed. *Id.* at 178–79. Although *Diehr's* claims employed a mathematical formula (Arrhenius equation) that was run on a programmed digital computer, the claims in *Diehr* covered patent-eligible subject matter because they did not pre-empt the use of the equation, but only foreclosed others from applying that equation with all the other steps in their claimed process: Steps of "installing rubber in a press, closing the mold, constantly determining the

temperature of the mold, constantly recalculating the appropriate cure time through the use of the formula and a digital computer, and automatically opening the press at the proper time." *Id.* at 187. The Court explained that claims are patent eligible under § 101 "when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect." *Id.* at 192.

Like *Diehr's* claims, Appellant's claim 1 is directed to an improvement that does not just reside in a mathematical formula or algorithm. Appellant's improvement is in an apparatus that performs a function that the patent laws were designed to protect: An apparatus that measures inertial effects. The improvement is to the arrangement of the sensors along with the use of sensors to validate information of a different sensor.

That the improvement is to the arrangement of the sensors along with the validation technique becomes clear when one considers the disclosure of the improvement within the written description of the Specification. The written description explains that "inertial sensors may be formed with MEMS devices on an integrated circuit wafer substrate to form various applications, such as a MEMS gyroscope that is used to detect the rate of change of a position variable (e.g., angular position) for an object, or a MEMS linear accelerometer that is used to measure the rate of increase or decrease in the velocity of an object." Spec. ¶ 2. According to the Specification, conventional methods of validating inertial sensor data used redundant sensors and/or correlations with alternative external

measurements, e.g., using external wheel speed and wheel angle sensors external to a MEMS gyroscope sensor in a vehicle. *Id.* Using sensors positioned around a vehicle introduces errors and delays in the data from the sensors. *Id.* Appellant packages all the necessary sensors in one package with the processing unit and uses a prediction algorithm to validate the sensor data without the need to gather data from external sensors. Spec. ¶ 9. Thus, the improvement is not in the algorithm alone, but in the combination of providing the sensors in the package with the processing unit and using those internal sensors to validate each other.

Claim 1 is specific enough and directed to the improvement. Thus, we determine it does not pre-empt the algorithm itself, but only the specific combination of sensors with the processing unit in a package as required by the claim. Claims 21–24 are analogously limited to a packaged multi-sensor device. Thus, we determine that claims 1 and 21–24, plus those dependent therefrom, are directed to statutory subject matter.

Claim 13 is not directed to a packaged multi-sensor device. Claim 13 is directed to a method for validating a numerical value. The steps of the process amount to data gathering from known types of sensors and using mathematical algorithms to manipulate the data (transforming measured values into estimated values and comparing estimated values to measured values to assess the validity of the measured value). The claim does not require the sensors to be within a package. The improvement is wholly to the algorithm and a patent to this claim would pre-empt the use of the algorithm itself. It does not contain the additional elements that transform the nature of the claim into a patent-eligible application that claims 1 and

21–24 contain. Thus, we determine that claim 13 is directed to non-statutory subject matter.

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
1–4, 6–13, 17, 18, 21–25	§ 101	1–4, 6–12, 21–25	13, 17, 18

DECISION

The Examiner's decision is affirmed-in-part.

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)(1)(iv).

AFFIRMED-IN-PART