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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/743,643	06/18/2015	Thierry COLLET	0563-1321	9525

466 7590 12/18/2019

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EXAMINER	
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ART UNIT	PAPER NUMBER
2856	

NOTIFICATION DATE	DELIVERY MODE
12/18/2019	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte THIERRY COLLET and ROLAND HAUFLER

Appeal 2019-001318
Application 14/743,643
Technology Center 2800

Before JEFFREY B. ROBERTSON, MICHAEL G. McMANUS, and SHELDON M. McGEE, *Administrative Patent Judges*.

McMANUS, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] seeks review of the Examiner's decision to reject claims 1–7 and 9–22. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies the real parties in interest as Continental Automotive France and Continental Automotive, GmbH. Appeal Brief filed June 6, 2018 ("Appeal Br.") 2.

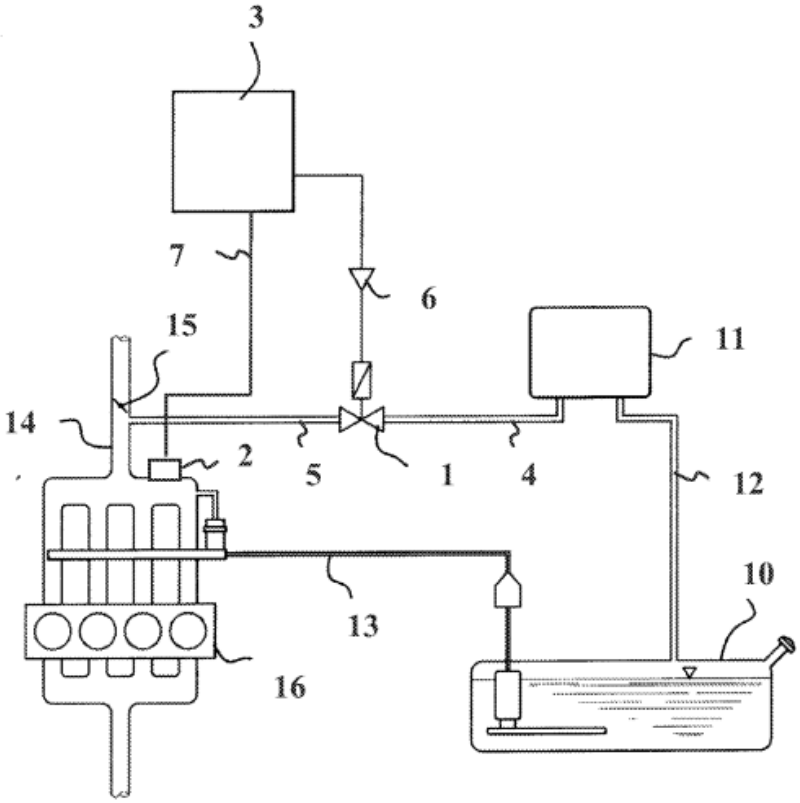
CLAIMED SUBJECT MATTER

The present application generally relates to a method for determining the opening point of a two-position valve. Specification filed June 18, 2015 ("Spec.") 1:5–7.

The Specification describes a method that includes the use of a pulse width modulated (PWM) signal to open a two-position valve. *Id.* at 1:9–10. A pulse width modulated signal is one where the duration that the signal is in the high state is modulated so as to simulate amplitude proportionality. *Id.* at 3:12–16. The Specification refers to this signal as "test signal ST." *Id.* at 6:1–2. The duty cycle (designated as "R") of test signal ST is the proportion of time that the signal ST is in a high state for a given period. *Id.* at 3:22–31; *id.*, Figure 3.

The point at which the valve opens to permit the flow of fluid or gas is designated as the opening point PO. *Id.* at 4:1–6. The Specification teaches "so that any derived model, such as a flow estimator, is precise, or for other applications, it is necessary to know precisely the opening point PO of a valve 1 or the minimum duty cycle R on the basis of which the valve 1 effectively opens." *Id.* at 4:4–6.

Figure 4 of the Application illustrates performance of the method taught by the patent.



Spec., Fig. 4. The Specification describes Figure 4 as "a partial schema of the fuel supply system of a motor vehicle." *Id.* at 4:16–17. The figure shows valve 1, pressure sensor 2, processing unit 3, upstream pipe 4, downstream pipe 5, and vapor filter 11.

The Specification teaches that "pressure signal 7 is typically measured by a pressure sensor 2." *Id.* at 6:12. The Specification further teaches that "[t]he moment of opening [t_0], at which a variation of the detection signal S is produced, is noted. The opening point PO is then determined by the duty cycle R of the test signal ST at said noted moment [t_0]." *Id.* at 6:13–15. Pressure signal 7 is modified so as to achieve detection signal S. *Id.* at 7:5–7. The Specification teaches that, as a preliminary step, the noise associated with the pressure sensor 2 is "learned." *Id.* at 6:34–7:4.

Subsequently, "[i]n accordance with a preferred embodiment at least one function of the filter producing the detection signal S on the basis of the pressure signal 7 performs a subtraction that deprives the pressure signal 7 of said learned noise." *Id.* at 7:5–7.

Claim 1 is illustrative of the subject matter on appeal and is reproduced below:

> 1. A method for determining an opening point (PO) of a two-position valve (1) controlled by a pulse width-modulated signal (ST), the method comprising the following steps:
>
> • controlling the valve (1) by a pulse width modulated test signal (ST) having a duty cycle (R) growing as a function of time (T),
>
> • detecting an opening of the valve (1) by observation of a variation in the time of a detection signal (S) provided by a pressure signal (7) measured by a pressure sensor (2) arranged in a pipe (4, 5) connected to the valve (1) and noted at the instant (to) of said variation of the detection signal (S), the opening point (PO) being the duty cycle (R) of the test signal (ST) at said noted instant (to).

Appeal Br. 15 (Claims App'x).

REJECTIONS

The Examiner maintains the following rejections:

1. Claims 1–7 and 9–22 are rejected under 35 U.S.C. § 101 as directed to non-statutory subject matter. Final Act. 3–4.
2. Claims 11–14 and 21 are rejected under 35 U.S.C. § 112(b) as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventors regard as the invention. *Id.* at 5–6.

DISCUSSION

Rejection 1. The Examiner rejects claims 1–7 and 9–22 as directed to non-statutory subject matter on the bases that 1) certain limitations are directed to transitory forms of signal transmission, and 2) the claims recite an abstract idea and, considering all claim elements both individually and in combination, do not amount to significantly more than the abstract idea. Final Act. 3–4.

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 long interpreted 35 U.S.C. § 101 to include implicit exceptions: "[l]aws of nature, natural phenomena, and abstract ideas" are not patentable. *E.g.*, *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we are guided by the Supreme Court's two-step framework, described in *Mayo* and *Alice*. *Alice*, 573 U.S. at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). In accordance with that

framework, we first determine what concept the claim is "directed to." *See Id.* 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, or protecting against risk.").

Concepts determined to be abstract ideas, and thus patent ineligible, include mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 69 (1972)). 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). "[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention." *Id.*

In January 2019, the PTO published revised guidance on the application of section 101. *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) ("Guidance"). Under the 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)).

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, 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 Guidance.

Appellant argues that the method of the claims, considered as a whole, is not an abstract idea under Step 2A of the Section 101 analysis. Even were it considered abstract, Appellant argues, when considered as an ordered combination, the claims are directed to significantly more than an abstract idea. Appeal Br. 4–10.

Step 1

Section 101 provides 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." 35 U.S.C. § 101.

The Examiner finds that claim 1 recites a method where a two-position valve is controlled by a pulse width-modulated signal. Final Act. 3. The Examiner determines that the PWM signal limitation is "directed to transitory forms of signal transmission" rather than a statutory class of invention and is therefore not patent-eligible. *Id.* (citing *In re Nuijten*, 500

F.3d 1346, 1357 (Fed. Cir. 2007)). The Examiner similarly determines that the detection signal limitation is "directed to transitory forms of signal transmission" and is therefore not patent-eligible. *Id.*

In *In re Nuijten*, the Federal Circuit held that transitory signals are not patent eligible because they are not directed to one of the four categories of statutory subject matter: process, machine, manufacture, or composition of matter. *See In re Nuijten*, 500 F.3d 1346, 1354–57. Here, however, the claims are directed to a "method" which qualifies as a "process" under section 101. *See* 35 U.S.C. § 100(b); *see also* Appeal Br. 6. The *Nuitjen* Court explained that claim one of Nuijten's patent, "a method for embedding supplemental data in a signal . . ." was allowed by the Patent and Trademark Office because it was a "claim[ ] to a process he invented"). *Id.* at 1357 n. 9; *see also Femto-Sec Tech, Inc. v. Lensar, Inc.*, 2016 WL 6963049 *4 (C.D. Cal. 2016) (holding that a method that includes the use of a pulsed laser is directed to statutory subject matter).

In view of the foregoing, we determine that the Examiner's determination that the claims are not directed to statutory subject matter because the foregoing limitations are directed to transitory forms of signal transmission is in error.

Step 2A, Prong 1

Under Step 2A, Prong 1 of the Guidance, we determine whether claim 1, being directed to a statutory class of invention, nevertheless falls within a judicial exception.

The Examiner determines that the detection step is "directed to an algorithm run on processor (3) including filtering the pressure signal" and is therefore abstract as a mathematical algorithm. Final Act. 3–4.

Claim 1 requires "detecting an opening of the valve (1) by observation of a variation in the time of a detection signal (S) provided by a pressure signal." Appeal Br. 15.

The Guidance indicates that "concepts performed in the human mind" fall within the category of abstract mental processes. Guidance 52. The Guidance specifies that such mental processes include "**observation**, evaluation, judgment, [and] opinion." *Id.* (emphasis added). The detecting of a valve opening "by observation" falls within this mental process category.

The Guidance further informs that mathematical concepts fall within the abstract idea exception. The Specification teaches that "[t]he variation of the detection signal S over a time interval Δt is used to detect opening of the valve 1." Spec. 8. That is, the processing unit 3 compares detection signal S at one time to the same signal at a subsequent time. *See* Spec. 6:1–15; Fig. 4. This is further described as follows in the context of Figure 5:

> At the end of a new measurement duration, the third phase P3 starts. The control signal ST is modified such that the corresponding duty cycle R is increased by an increment. It can be observed over the pressure signal 7 that oscillations reproducing the oscillations of the control signal ST can be observed. **It follows that the value of the detection signal S, indicative of a variation, sees its value rise. Here, this rise has the form of a ramp, due to the presence of an integrator in the processing, so as to amplify the variation. Here in a particular embodiment, the slope of the signal S is proportional to the amplitude of the pressure variation.**

> It follows that **the value S2 of the detection signal S has a significant variation relative to the reference value SO**. This is indicative of an opening of the valve 1. The value of the duty cycle R can then be noted and provides the opening point PO.

Spec. 9 (emphasis added). Thus, the Specification teaches that the determination of detection signal S includes various mathematical relationships, and, as such, claim 1 recites a mathematical relationship.

Accordingly, we determine that claim 1 recites abstract subject matter under the Guidance.

Step 2A, Prong 2

Next, we determine whether the claim as a whole integrates the recited judicial exception into a practical application of the exception. The Guidance teaches that one may evaluate integration into a practical application by:

> (a) identifying whether there are any additional elements recited in the claim beyond the judicial exception(s); and
>
> (b) evaluating those additional elements individually and in combination to determine whether they integrate the exception into a practical application.

Guidance 54–55.

The Guidance further teaches certain exemplary conditions that are indicative that an additional element (or combination of elements) may integrate the exception into a practical application. One such circumstance is where "an additional element reflects an improvement in the functioning

of a computer, or an improvement to other technology or technical field." *Id.* at 55.

Appellant argues that the claims are directed to a method of determining an opening point of a valve "wherein the opening point comprises the minimum value of a signal, and the minimum value is determined via a series of steps that involve a particular sensor arranged in a particular way in pipes connected to the valve." Appeal Br. 7. Appellant further argues that "the opening point that is the subject of the claimed determining is ("being") the duty cycle (R) of the test signal (ST) at a particular instant, wherein the instant is determined by a pressure sensor in a pipe connected to a valve being controlled in a particular way." *Id.* at 8.

Here, in addition to the abstract comparison required by the detection step, claim 1 requires the additional process steps of "controlling the valve" with a pulse width modulated signal which entails increasing the duty cycle of the signal over time. Appeal Br. 15 (Claims App'x.). Claim 1 further requires use of a pressure sensor placed in a pipe to provide a pressure signal. *Id.*

The Specification teaches that in prior art systems, in the context of an automobile fuel system, "a method for determining the opening point PO of the bleed valve 1 lies in progressively controlling the bleed valve and in observing a deviation of a richness sensor or of a richness controller." Spec. 5:20–22. The Specification further teaches that "[s]uch a method has a number of disadvantages" including "a relatively long determination duration, typically around 30 seconds." *Id.* at 5:20–22, 30–31. The Specification teaches that the duration of the detection measurement of the

claimed method "is between 1 and 4 seconds, preferably equal to 2 seconds." *Id.* at 6:25–26.

We determine that the additional elements, considered in conjunction with the detection step, reflect an improvement in the functioning of valve opening technology. Accordingly, the claim as a whole integrates the recited abstract subject matter into a practical application, and the claim does not fall within a judicial exception to section 101. That is, we determine that the Examiner erred in determining that the claim as a whole is directed to abstract subject matter. As a result, we need not reach Step 2B. Guidance 54.

Rejection 2. The Examiner rejects claims 11–14 and 21 as being indefinite.[2] Final Act 5–6. Appellant did not address this rejection in its Appeal Brief. *See* Appeal Br., generally; *see also* Answer 7. Accordingly, we summarily affirm the rejection. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2012); *see also* Manual of Patent Examining Procedure (MPEP) § 1205.02 (9th ed. Mar. 2014) ("If a ground of rejection stated by the examiner is not addressed in the appellant's brief, appellant has waived any challenge to that ground of rejection and the Board may summarily sustain it, unless the examiner subsequently withdrew the rejection in the examiner's answer.").

[2] Despite the Examiner indicating "[i]t also appears all of the rejections under 112(a) and 112(b) have been overcome [by the proposed amendment]," in the Advisory Action dated April 2, 2018, the Examiner did not enter the proposed amendment (*id.* at 2) and expressly maintained this rejection in the Answer, Ans. 3. Appellant failed to address this rejection in either Brief.

CONCLUSION

The Examiner's rejection of claims 1–7 and 9–22 as directed to patent ineligible subject matter is reversed. The Examiner's rejection of claims 11–14 and 21 as indefinite is affirmed.

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–7, 9–22	101	Ineligible subject matter		1–7, 9–22
11–14, 21	112(b)	Indefiniteness	11–14, 21	
Overall Outcome			11–14, 21	1–7, 9, 10, 15–20, 22

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-IN-PART