UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
LAGUARDA, GONZALO

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PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte KEISUKE MINATOYA, ATSUSHI IZUMIURA,
TADAYOSHI SASAKI, SHIGETAKA KURODA,
and MAHITO SHIKAMA[1]

_____

Appeal 2017-001541
Application 13/410,337
Technology Center 3700

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Before JOHN C. KERINS, JAMES P. CALVE, and
FREDERICK C. LANEY, *Administrative Patent Judges.*

KERINS, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Keisuke Minatoya et al. ("Appellants") appeal under 35 U.S.C.
§ 134(a) from a final rejection of claims 1, 3, and 4. We have jurisdiction
under 35 U.S.C. § 6(b).

We REVERSE.

_____

[1] Honda Motor Co. is identified as the real party-in-interest. Appeal Br. 3.

THE INVENTION

Appellants' invention is directed to a misfire detecting apparatus and method. Claim 1, reproduced below, is illustrative:

1. A misfire detecting apparatus for an internal combustion engine, having engine rotational speed parameter detecting means for detecting an engine rotational speed parameter indicative of a rotational speed of said engine of which an output shaft is connected via a torsion element to an input shaft of a transmission mechanism, and detecting a misfire of said engine based on the detected engine rotational speed parameter, said misfire detecting apparatus comprising:

transmission rotational speed parameter detecting means for detecting a transmission rotational speed parameter indicative of a rotational speed of said input shaft of said transmission mechanism;

modifying means for calculating a modified engine rotational speed parameter by modifying the detected engine rotational speed parameter based on the transmission rotational speed parameter, an engine rotation moment on the input side of said torsion element, and a transmission rotation moment on the output side of said torsion element;

correcting means for calculating, at predetermined crank angles, an average change amount of the modified rotational speed parameter in a predetermined period, and an inertia speed changing component which is generated with rotation of said engine, and further calculating a corrected rotational speed parameter by correcting the modified rotational speed parameter according to the average change amount and the inertia speed changing component;

relative speed parameter calculating means for calculating a relative speed parameter according to a difference between a reference value and the corrected rotational speed parameter, the reference value being the corrected rotational speed

2

parameter corresponding to the rotational speed parameter which is detected at a reference timing at which a piston of a cylinder, which is subjected to the misfire determination, is positioned in the vicinity of the compression top dead center;

determination parameter calculating means for calculating a determination parameter by integrating the relative speed parameter for an integration period corresponding to 720/N degrees of the crank angle ("N" is a number of cylinders of said engine);

determining means for performing a misfire determination based on the determination parameter; and

providing means for providing an indication of normal or abnormal combustion of the internal combustion engine based on the misfire determination,

wherein the reference timing and a start timing of the integration period are set according to the ignition timing of said engine, and

wherein said modifying means calculates the modified engine rotational speed parameter using the following equations (A) and (B):

$$OMG = KRI \times OMGCRK + (1 - KRI) \times OMGMAIN \qquad (A)$$

$$KRI = ICRK/(ICRK + IMAIN) \qquad (B)$$

where "OMG" is the modified engine rotational speed parameter, "OMGCRK" is the detected engine rotational speed parameter, "OMGMAIN" is the detected transmission rotational speed parameter, "KRI" is an inertia moment ratio given by the equation (B), "ICRK" is the engine rotation moment, and "IMAIN" is the transmission rotation moment.

THE REJECTIONS

The Examiner rejects:

(i) claims 1, 3, and 4 under 35 U.S.C. § 101 as constituting non-statutory subject matter, to wit, not significantly more than an abstract idea; and

(ii) claims 1, 3, and 4 under 35 U.S.C. § 103(a) as being unpatentable over Citron (US 5,699,252, issued Dec. 16, 1997) in view of Da (US 6,600,988 B1, issued July 29, 2003).

ANALYSIS

35 U.S.C. § 101

The Examiner takes the position that "[t]he claims is/are directed to the abstract idea of a mathematical relationship or formula." Final Act. 3. The entire analysis set forth in the rejection is as follows:

> The additional element(s) or combination of elements in the claim(s) other than the abstract idea per se amount(s) to no more than: recitation of generic computer structure that serves to perform generic computer functions that are well-understood, routine, and conventional activities previously known to the pertinent industry. Viewed as a whole, these additional claim element(s) do not provide meaningful limitation(s) to transform the abstract idea into a patent eligible application of the abstract idea such that the claim(s) amounts to significantly more than the abstract idea itself. Therefore, the claim(s) are rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter.

Id. at 3–4.

In response to Appellants' arguments traversing the Examiner's position, the Examiner posits that:

4

> [T]he claims are drawn specifically to the detection of misfire
> and no changing of the actual system beyond merely an
> indication that it has occurred. As such these claims would
> affect no substantive change and so does not overcome the 101
> rejection. . . . More specifically the applicants argue that
> accurate detection is important to an engine system, what is
> missing from the arguments is not only accurate detection but
> mitigation. The claims are only drawn to the detection with no
> change in the system to respond to the adverse effects that the
> applicant argues occur with misfire.

Final Act. 13.

In the Answer, the Examiner again directs attention to the fact that the

claims do not require any particular action or response to the detection of a

misfire, as somehow being a factor in determining that the claims are

directed to an abstract idea, without significantly more, stating:

> The claims of this system do nothing to mitigate misfire
> making the limitations of the claims extra solution activity.

and

> The 101 rejection requires "significantly more" to be
> done with the apparatus or method than just the sum of their
> parts. As pointed out in the rejection using a computer and
> mathematical equations is a known way to detect misfire and
> the reference matches those limitations. Also the claims are
> drawn specifically to the detection of misfire and no changing
> of the actual system beyond merely an indication that it has
> occurred, and this indication is only internal to the computer
> which does not output these results. As such these claims would
> affect no substantive change and so does not overcome the 101
> rejection.

Ans. 2, 3–4.

The Examiner's initial analysis, while correctly stating the standard

for analyzing a claim to determine whether it is directed to non-statutory

subject matter, does not address the particular claim limitations making up

the claims as a whole, nor explain why those limitations are considered either part of the abstract idea, or, if not, why they are regarded as not providing significantly more to the abstract idea. Accordingly, we find this to be an insufficient basis on which to sustain the rejection. *See Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2355, 2359–60 (2014) (under step two, the claims must be analyzed individually (separately) and as an ordered combination (as a whole) to determine whether any additional elements transform the nature of the claim into a patent-eligible application); *see also In re Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018) (summary judgment is appropriate under step two of *Alice* only when there is no genuine issue of material fact regarding whether the claim element or claimed ordered combination is well-understood, routine, and conventional to a skilled artisan in the relevant field); Reply Br. 8–9 (arguing that ordered arrangement of claim elements achieves a technical improvement); Appeal Br. 13–19) (arguing that claim limitations individually and in combination improve existing misfire detection).

The additional focus on what the claims do not include, i.e., a means or step for mitigating a detected misfire, also does not provide us with a basis for sustaining the rejection. We are not aware of any precedent requiring the type of additional step that the Examiner appears to believe to be necessary to bring the claims within the realm of statutory subject matter.

The rejection of claims 1, 3, and 4 under 35 U.S.C. § 101 is not sustained.

35 U.S.C. § 103(a)

The Examiner appears to recognize that neither Citron nor Da discloses the particular manner by which the claimed modifying means

determines the value of the claimed "modified engine rotational speed

parameter," in stating:

> (Equations found in columns 6-10 are found to be equivalent
> subject matter. The requirement for overcoming, or not being
> obvious, is that the parts must be greater as a whole (synergism)
> (See MPEP 716.02(a)).
>
> The combination of an engine speed sensor with a
> computer is a known structure. The known benefit of computers
> for quick calculations and actuation of a system is an obvious,
> known and implemented technique. The programming of
> computers with mathematical equations is a necessity. The cited
> reference teaches a program with its chosen mathematical
> relationship. The ability to develop your own mathematical
> relationship is an obvious optimization that would be obvious to
> try with the finite variables to consider, that has predictable
> solutions with a reasonable expectation of success. See MPEP
> 2143. As such this claim is seen to be an obvious variant).

Final Act. 6–7 (emphasis omitted).

Responding to Appellants' arguments that Citron fails to provide any

guidance that would have led one of ordinary skill in the art to determine

that the occurrence of engine misfire could be determined using a modified

engine rotational speed parameter calculated in the manner claimed, the

Examiner states that, "the obviousness of the formulas when the prior art is

considering similar variables is also not overcome because these formulas

are purely abstract and so do not have patentable weight." Ans. 4; *see also*

id. at 5.

The Examiner provides no underlying evidence that supports the

position that the claimed approach to determining the occurrence of misfire

would have been an obvious optimization or would have been obvious to try,

or that the equations disclosed in Citron are equivalent subject matter to the

claimed equations and thereby render the claimed equations obvious. We

are further unaware of any precedent that, even if the Examiner is correct that the equations recited in the claims for obtaining a modified engine rotational speed parameter are abstract ideas, they are to be afforded no patentable weight on that basis, particularly where the Examiner also finds that programming computers with mathematical equations is a necessity.

We do not sustain the rejection of claims 1, 3, and 4 as being obvious over Citron and Da.

DECISION

The rejections of claims 1, 3, and 4 under 35 U.S.C. § 101 and § 103(a) are reversed.

REVERSED