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EXAMINER
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KIM, KYUNG J

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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* GERHARD HIETMANN and MARTIN WEISS

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Appeal 2014-006764<sup>1</sup>  
Application 11/719,182<sup>2</sup>  
Technology Center 3600

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Before BIBHU R. MOHANTY, CYNTHIA L. MURPHY, and  
AMEE A. SHAH, *Administrative Patent Judges*.

SHAH, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's decision finally rejecting claims 36, 42–45, 50–53, and 59–69. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE and ENTER a NEW GROUND OF REJECTION pursuant to our authority under 37 C.F.R. § 41.50(b).

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<sup>1</sup> Throughout this opinion, we refer to the Appellants' Appeal Brief ("Appeal Br.," filed Aug. 13, 2013), Reply Brief ("Reply Br.," filed May 27, 2014), and Specification ("Spec.," filed May 11, 2007), and the Examiner's Answer ("Ans.," mailed Mar. 28, 2014) and Final Office Action ("Final Act.," mailed Mar. 14, 2013).

<sup>2</sup> According to the Appellants, the real party in interest is KUKA Roboter GmbH. Appeal Br. 3.

### STATEMENT OF THE CASE

The Appellants' invention is directed to "a method for adjusting and controlling an automatically controlled manipulator such as a robot, using a dynamic manipulator model taking into consideration friction torques that appear in gear mechanisms provided for moving axes of the manipulator." Spec. 3.

Claims 36 and 53 are the independent claims on appeal. Claim 36, which we reproduce below, is illustrative of the subject matter on appeal:

36. A method of adjusting or controlling an automatically controlled robotic manipulator having shafts driven by motors and associated gear mechanisms, the method comprising:

determining a gear mechanism friction torque as a function of gear mechanism temperature; and

determining a target value for at least one of a motor position or a motor current associated with at least one shaft of the robotic manipulator using a dynamic manipulator model that accounts for friction torques in the gear mechanisms, the model including a gear mechanism friction torque model for the at least one shaft based on driven-side shaft velocities and shaft accelerations.

Appeal Br. 12 (Claims App.).

### REJECTIONS

Claims 36, 42–45, 50–53, 59–63, and 65–69 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gunnarsson (US 2004/0093119 A1, pub. May 13, 2004) in view of pages 4–5 of Appellants' Specification (hereafter "Admitted Prior Art").

Claim 64 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Gunnarsson, Admitted Prior Art, and Kuno (US 5,006,999, iss. Apr. 9, 1991).

### FINDINGS OF FACT

The findings of fact in the Analysis section below are supported at least by a preponderance of the evidence.<sup>3</sup>

### ANALYSIS

The Appellants contend that the rejection of independent claim 36 is in error because the prior art does not disclose, in relevant part, “using a dynamic manipulator model that accounts for friction torques in the gear mechanisms, the model including a gear mechanism friction torque model for the at least one shaft based on driven-side shaft velocities and shaft accelerations,” as recited. *See* Appeal Br. 7–10; *see also* Reply Br. 2–3. We agree.

The Examiner finds that Gunnarsson discloses a method of auditing or control a robotic manipulator comprising determining a target value for a motor position or motor current using a dynamic manipulator model, as partially recited in claim 36. *See* Final Act. 2–3. The Examiner admits that Gunnarsson does not disclose “determining a gear mechanism friction torque as a function of gear mechanism temperature,” and the dynamic model including “a gear mechanism friction torque model for the at least one shaft

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<sup>3</sup> *See Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Patent Office).

based on driven-side shaft velocities and shaft accelerations,” but cites to Appellants’ Specification as Admitted Prior Art to correct this deficiency. *See id.* at 3–4. The Examiner finds that the Admitted Prior Art’s use of maximum values that are based on velocities and accelerations meets the claim language and “shows a conventional model using speed and acceleration of the manipulator axes to calculate the maximum estimated friction values, from which claims 36 and 53 are **not** distinguished.”

Ans. 23 (citing Spec. 4). The Examiner further finds it would be obvious to “add the friction torque detection of the [Admitted Prior Art] to the robot of Gunnarsson . . . in order to more effectively control the mechanism in real-time by compensating for variations in temperature and force and to compensate for errors present due to friction.” *Id.* at 4.

We find persuasive the Appellants’ argument that the Admitted Prior Art does not teach or suggest that the model used is based on driven-side shaft velocities and shaft accelerations as required by claim 36. *See* Appeal Br. 8. The portions of the Specification considered by the Examiner as Admitted Prior Art provide that a known dynamic model that ordinarily comprises a model for friction forces in the “movable part of the robot, particularly the gear mechanisms,” is used for calculating target torques at the motors and gear mechanisms based on loads, position, speed, and acceleration of the axes/shafts. Spec. 4. The portions further provide “it is possible, from measured actual values for current, position, velocity, acceleration or the like, to calculate an estimate of the current motor and gear mechanism torques of the robot.” *Id.* It is not clear that, and the Examiner does not adequately explain how, the Admitted Prior Art discloses the dynamic friction force model includes a gear friction torque model based

on driven-side shaft velocities and shaft accelerations. Even *assuming arguendo* the Examiner's finding that the Admitted Prior Art shows that the model uses speed and acceleration of the manipulator axes to calculate the maximum estimated friction values that are used by the model to determine a target value for the motor position or current (*see* Ans. 23), it is not clear that the speed and acceleration used is of the driven-side shaft as claimed.

Thus, we do not sustain the rejection of independent claim 36 and dependent claims 42–45 and 50–52.

Independent claim 53 recites a parallel limitation of “using a dynamic manipulator model that accounts for friction torques in the gear mechanisms, the model including a gear mechanism friction torque model for the at least one shaft based on driven-side shaft velocities and shaft accelerations” in determining torque as a function of temperature. The Examiner relies on findings and reasoning similar to those of claim 36 in determining that the Admitted Prior Art corrects the deficiency of Gunnarsson with regards to this limitation. Thus, for reasons similar to claim 36, we also do not sustain the rejection of independent claim 53 and dependent claims 59–63, 65, and 66. We also do not sustain the rejection of dependent claim 64 as the rejection does not cure the deficiency in the Examiner's rejection of independent claim 53.

#### NEW GROUND OF REJECTION

Pursuant to our authority under 37 C.F.R. § 41.50(b), we reject claims 36, 42–45, 50–53, and 59–69 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. We find the claims are ineligible for patent protection because they are directed to an abstract idea.

The decision in *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347 (2014) is controlling. We analyze the claims using a two part-analysis: 1) determine whether the claims are directed to an abstract idea; and 2) if an abstract idea is present in the claims, determine whether any element, or combination of elements, in the claims is sufficient to ensure the claims amount to significantly more than the abstract idea itself to transform the claims into a patent-eligible invention. *See id.* at 2355.

Under the first step of the analysis, we find claims 36, 42–45, 50–53, and 59–69 are directed to an abstract idea because they are directed to the fundamental process of using mathematical formulas/models to determine temperature and torque. *See Spec.* 5, 12. We note that although the eventual purpose of the models can be to control a manipulator, the claims do not recite any steps or functions for actually doing so. A mathematical formula/model is a patent-ineligible abstract idea. *Alice Corp.*, 134 S. Ct. at 2355, citing *Parker v. Flook*, 437 U.S. 584, 594–595 (1978).

Under the second step of the analysis, we find neither independent claims 36 and 53 nor dependent claims 36, 42–45, 50–52, and 59–69 have any additional elements that amount to significantly more to transform the abstract idea of calculating temperature and torque into a patent-eligible invention. Independent claim 36 and dependent claims 42–45, 51, and 52 recite a method that can be performed manually and with only the human mind. Independent apparatus claim 53 and dependent claims 59–69 recite units that comprise a general computer to perform the functions of the claims. *See Spec.* 10. The introduction of a computer to implement an abstract idea or mathematical principle is not a patentable application of the abstract idea. *Alice Corp.*, 134 S. Ct. at 2357–2358, citing *Flook*, 437 U.S.

at 594. The computer implementation here is purely conventional and performs basic functions of determining values and data. *See Alice Corp.*, 134 S. Ct. at 2359–2360. The claims do not purport to improve the functioning of the computer itself, not do they effect an improvement in any other technology or technical field. *See Alice Corp.*, 134 S.Ct. at 2359.

Thus, under the two-part analysis, we conclude claims 36, 42–45, 50–52, and 59–69 are directed to an abstract idea and accordingly are directed to non-statutory subject matter.

### DECISION

The Examiner’s rejections of claims 36, 42–45, 50–53, and 59–69 35 U.S.C. § 103(a) are REVERSED.

A NEW GROUND OF REJECTION has been entered for claims 36, 42–45, 50–53, and 59–69 35 are rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

37 C.F.R. § 41.50(b) provides that “[a] new ground of rejection . . . shall not be considered final for judicial review.” 37 C.F.R. § 41.50(b) also provides that the Appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the Examiner.



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Application 11/719,182

(2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record.

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).

REVERSED; 37 C.F.R. § 41.50(b)